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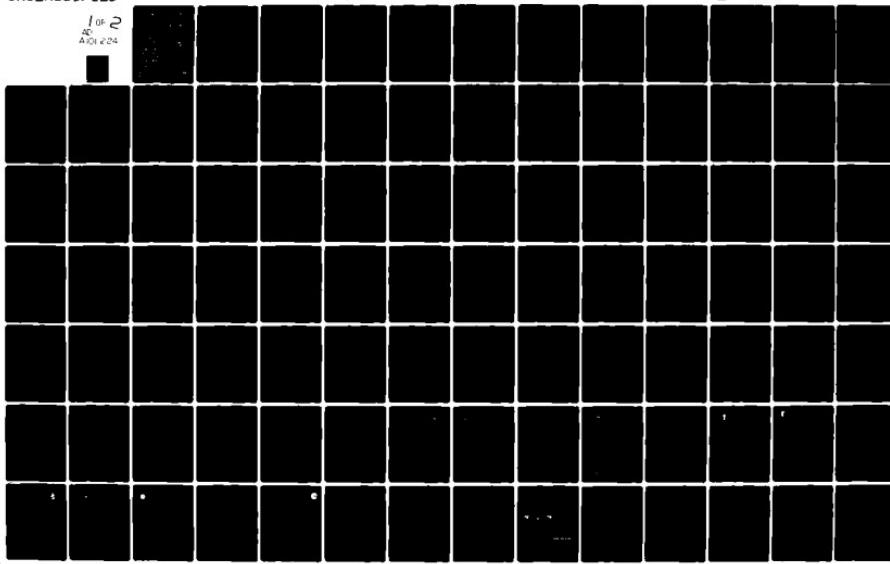
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BUFFALO METROPOLITAN AREA, NEW YORK WATER RESOURCES MANAGEMENT.--ETC(U)  
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# BUFFALO METROPOLITAN AREA, NEW YORK WATER RESOURCES

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EVEL MANAGEMENT

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INTERIM  
REPORT ON  
FEASIBILITY OF  
COMPREHENSIVE  
WATER AND  
RELATED LAND  
MANAGEMENT

FINAL  
FEASIBILITY  
REPORT

ONE FILE COPY



U.S. ARMY  
BUFFALO DISTRICT  
CORPS OF ENGINEERS



DECEMBER

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② Buffalo Metropolitan Area  
New York Water Resources  
Management.

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INTERIM REPORT

ON

FEASIBILITY OF COMPREHENSIVE WATER AND RELATED LAND MANAGEMENT

⑨ Final rept.

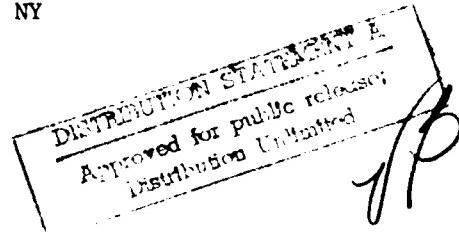
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## SYLLABUS

This final feasibility report is one of four studies that comprise the Buffalo Metropolitan Area Study. The other three studies are concerned with flood management in Cayuga, Cazenovia, and Tonawanda Creek Watersheds. This study report identifies a practical development plan for improved access, fishing, and recreational opportunity in the Buffalo Metropolitan Area and along the Niagara Riverfront. Region-wide programs to achieve effective control of floating drift and streambank stabilization are discussed. An important aspect of the considered plans is staged development according to the availability of funding.

The study has considered several areas including the Niagara River which is a largely underdeveloped natural resource immediately adjacent to a large urban population. Large areas of heavy industrial and commercial development have left only isolated riverbank areas with fishing and recreation potential. The considered plans include measures to interconnect these areas, provide safe access, and develop fishing and recreational opportunity.

Stressed are the use of public transportation, bicycle paths, waterfront ferry service, and strolling as access modes, and safety and aesthetics as criteria. Development measures include new park land with picnicking facilities, landscaping, comfort stations, water safety equipment, and improved safety for fishing through the use of railings and sloping stairlike bulkheads along the shoreline.

Control of floating drift and debris in streams and along the waterfront, and streambank stabilization are problems of the region that diminish the environmental, recreational, and other beneficial uses of the water resource. A practical program of intergovernmental cooperation and sharing of resources is suggested that could lead to long-term management and control of these problems.

Implementation of the plan measures will contribute significantly to the social well-being and environmental appreciation and enjoyment of the expanding urban population of the Buffalo Metropolitan area with minimal adverse impacts.

The development plan would provide 3.0 million annual recreation user days, or approximately \$3.7 million in equivalent annual benefits at an equivalent annual cost of approximately \$1.04 million. The benefit-cost ratio of this plan is 3.5:1.0. The first phase of development could provide 2.0 million annual recreation user days, or approximately \$2.5 million in equivalent annual benefits at an equivalent annual cost of approximately \$0.5 million. The benefit cost ratio of the first phase of development is 4.7:1.0.

Corps participation in the implementation of the development plan would include:

- (1) Rehabilitation of the Bird Island Pier for public safety; and
- (2) Dredging of Black Rock Canal to remove additional sediment deposition from Scajaquada Creek if the Creek is by-passed around Delaware Park Lake.

The U. S. Bureau of Outdoor Recreation could cost-share with non-Federal interests in the development cost of all elements of the development plan except the Corps activities outlined above and the Waterfront Ferry Service.

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BUFFALO METROPOLITAN AREA, NY  
COMPREHENSIVE WATER AND RELATED LAND RESOURCE MANAGEMENT

FOREWORD

1. Purpose and Scope of Study

(The purpose of this Comprehensive Study is to develop alternative water and related land resource management plans compatible with the comprehensive urban development goals of the Buffalo Metropolitan Area.) This study is one of four studies that comprise the Buffalo Metropolitan Area Study. The other three studies are concerned with flood management in the Cayuga, Cazenovia, and Tonawanda Creek Watersheds. (This final feasibility report addresses provisions for improving streambank protection, water-related recreation, fish and wildlife management, and water-related environmental quality management. Since the Erie-Niagara Counties Regional Planning Board is developing a comprehensive areawide waste treatment management plan under Section 208 of Public Law 92-500, neither this final feasibility study nor the other reports accomplished by the Corps of Engineers under the Buffalo Metropolitan Area Study authority will include consideration of wastewater and related water quality management in the area.

This final feasibility study includes: an assessment of water and related land management needs; development of measures that respond to those needs; and, an evaluation of alternative plans.

2. Area of Study

The study area is shown on Plate 1. It includes all of the Erie-Niagara basin and those watersheds tributary to Lake Ontario eastward from the Niagara River to the Johnson Creek watershed. Portions of Chautauqua, Cattaraugus, Allegany, Wyoming, Genesee and Orleans Counties are included in the study area along with all of Erie and Niagara Counties. The Buffalo SMSA includes all of Erie and Niagara Counties. The major emphasis is on water and related land resource management needs in the intensely urbanized portion of the study area.

3. Authority

Authorization for a Buffalo Metropolitan Area Study derives from a resolution of the House Committee on Public Works sponsored by Congressman Jack F. Kemp and adopted on 14 June 1972 which reads:

"Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on Cazenovia Creek, and Cayuga Creek, NY, submitted in House Document No. 326, 77th

Congress, and other pertinent reports, with a view to determine whether any modifications of the recommendations contained therein are advisable at this time, with particular reference to providing improvements in the interest of flood control, wastewater management, water supply, water quality, environmental quality, recreation and fish and wildlife for the Buffalo River Basin, NY."

The Buffalo Metropolitan Area includes, in addition to the Buffalo River basin, the Buffalo urban area. Therefore, on 5 March 1973, OCE authorized enlargement of the study area to include the Buffalo urban area (SMSA) and redesignated the study "Buffalo Metropolitan Area, NY, 44012."

Section 11 of Public Law 93-251, dated 7 March 1974, authorizes a wastewater management study of the Buffalo River Basin, NY. The Erie-Niagara Counties Regional Planning Board has been granted \$1.8 million by the U. S. Environmental Protection Agency to develop a comprehensive areawide waste treatment management plan under Section 208 of Public Law 92-500. Since this plan will include the Buffalo Metropolitan area, it will satisfy the study resolution requirement pertaining to water quality and wastewater management. Therefore, the Corps of Engineers Buffalo Metropolitan study effort will not address water quality or wastewater management.

#### 4. Objectives

Based upon an assessment of regional needs and focusing the investigation on the Buffalo Metropolitan Area, the objectives in this study are to develop and evaluate alternative plans for structural and non-structural measures:

- a. to provide improved and expanded water-related recreation opportunities.
- b. to conserve and improve fish and wildlife resource.
- c. to preserve, develop, beautify, and restore the quality of the water-related environment; and
- d. to provide streambank stabilization and protection to prevent streambank erosion on specified reaches of streams in the study area.

These specific objectives were pursued in response to desires repeatedly expressed by study area residents for improved access to and development of streambanks, shorelands and associated parks. Full cognizance was taken of prior and on-going studies of the

Erie-Niagara Basin Regional Water Resources Planning Board and the Erie-Niagara Counties Regional Planning Board and the "Principles and Standards for Planning Water and Related Land Resources" developed by the President's Water Resources Council.

#### 5. Study Participants and Coordination

During the study, coordination was maintained with various Federal, State and local agencies and governmental entities, including:

U. S. Bureau of Outdoor Recreation  
U. S. Soil Conservation Service (Erie, Wyoming and Niagara Counties)  
New York State Department of Environmental Conservation  
New York State Office of Parks and Recreation  
Niagara Frontier State Park and Recreation Commission  
Niagara Frontier Transportation Authority  
Erie County, Department of Environmental Quality  
Erie-Niagara Counties Regional Planning Board  
City of Buffalo - Department of Public Works  
City of Buffalo - Department of Transportation  
City of Buffalo - Department of Planning and Programming

Informal workshops were held on 4 April 1975 and 9 May 1975 to acquaint interested agency personnel and involved public participants with study progress and to give them an opportunity to provide input to the study.

The development plan was discussed with a staff member of the Niagara Frontier State Park and Recreation Commission and staff of U. S. Bureau of Outdoor Recreation to determine cost-sharing arrangements for the development plan elements. An interagency meeting was held on 26 September 1975 to present cost-sharing possibilities and to obtain the views of the various levels of Government on implementation of the development plan.

A late stage public meeting was held on 5 November to present the plan to the general public and to solicit their views. Careful consideration was given to their views which are reflected in the recommendations. In addition, several informal meetings and discussions were held with local agencies and private interests. Their views are also reflected in the recommendations in this report.

## Chapter 1

### SETTING

#### 1. Study Area

The Buffalo Metropolitan Study Area (Plate 1) encompasses an area of approximately 2,500 square miles and contains all of Erie and Niagara Counties, substantial portions of Cattaraugus, Genesee, and Wyoming Counties, and small portions of Orleans, Allegany and Chautauqua Counties situated about its periphery.

The area is drained by the following major watersheds: Cattaraugus, Cazenovia, Buffalo, Cayuga, Scajquada, Ellicott, Tonawanda and Johnson Creeks. These watersheds drain into Lake Erie, the Niagara River and Lake Ontario and are bordered by numerous smaller watersheds.

#### 2. Population

The combined population of the study area in 1970 was estimated to be 1,422,200 people on the basis of 1970 Census data for each county in the study area.

The Buffalo SMSA which includes Erie and Niagara Counties had a population of 1,349,211 people in 1970, or 95 percent of the study area population.

Plate 2 shows the distribution of population within the study area and the Buffalo SMSA. The study area consists essentially of a strip of waterfront cities, the largest of which is the City of Buffalo, generally surrounded by concentric rings of urbanized and urbanizing areas. Projections of population growth made by the Regional Planning Board show that while Erie and Niagara Counties will have a total population growth of 25 percent by the year 2000,<sup>1/</sup> the strip of population centers along Lake Erie and the Niagara River, Area A in Plate 2, will almost uniformly show a population decline, the largest being the City of Buffalo with a projected decline of 12 percent by the year 2000. Nearly all the projected population growth is concentrated in the towns surrounding the urban center.

1/ The Regional Planning Board's projection of 1,682,685 people in the Buffalo SMSA in the year 2000 exceeds the OBERS projection of 1,419,600 people by 18.5 percent. The New York State Office of Planning Services projection is 1,557,250 people in the Buffalo SMSA in the year 2000. The Planning Board's projections were used since they are more localized projections and are those used in development of their regional planning efforts.

### 3. Economy

The Buffalo Metropolitan Area is a major industrial and transportation center. Major industrial areas are located in the City of Buffalo, principally near the Buffalo Harbor and along Lake Erie, and northward along the Niagara River to Tonawanda. The cities of Buffalo and Tonawanda have major port facilities that are connected by a Federally maintained navigation channel and lock in the Niagara River. Buffalo is a major rail transportation center, and lies astride the New York State Thruway, an important highway linking midwestern and eastern markets.

Outside the Buffalo urbanized area, the study area is primarily agricultural, consisting of small farms and dairies with several small urban centers of light industry. Fruit growing is significant along Lakes Erie and Ontario and there are small areas of high-value vegetable farming in the lake plains. However, agricultural employment now accounts for a small percentage of the total regional employment and is expected to decline to less than one percent by the year 2020.

Regional projections of total employment show the increase in total jobs of 18 percent, from 605,900 to 714,000 in 1990. However, the percentage of manufacturing jobs, now at 30 percent will decline by 1990 to 27 percent. Increased production requirements in the metals, machinery, chemicals, and durable goods industries of Buffalo are expected to be met in the future by improved technology.

A dramatic increase is expected in non-manufacturing and service industry employment, reflecting a gradual shift of the economic base from heavy industry and manufacturing to services. Gains are expected to be greatest in the fields of personal and business services, amusement and recreation, and medical and education services. A preliminary study by the State of New York Office of Planning Services suggests that about 25 percent of the projected population increase and an increase of 51,000 jobs within the Buffalo SMSA through 1985 will be attributable to the creation of the new 1,125-acre State University Campus in the Town of Amherst. SUNY at Buffalo will then be the largest employer in western New York.

### 4. Land Use

The study area consists of approximately 60 percent crop and pasture land, 20 percent woodland, and 20 percent urban lands. Except for a few scattered small urban communities, such as Batavia, Attica, Lockport, East Aurora, Arcade, Springville, and Gowanda, nearly all the urban land lies within the City of Buffalo and the

towns which surround the city in a circular manner. Concentrations of industrial land are located in the City of Buffalo near the Buffalo Harbor, southward from Buffalo along Lake Erie, and along the Niagara River in Tonawanda.

#### 5. Urban Growth Patterns and Projections

Population projections for the study area indicate a pattern of net long-term growth for the region, and in particular the Buffalo SMSA, but a net out-migration from the central urban area of Buffalo.

Urban and suburban development is moving outward in a radial manner from the city, urbanizing the formerly rural towns surrounding the city and encompassing older small urban localities such as Depew-Lancaster, Williamsville, East Aurora, and Hamburg (Plate 3).

Industrial growth is stretching southeastward from the Buffalo Harbor area, and the town of Lackawanna, into the town of Hamburg, and northeasterly from the town of Tonawanda. Significant industrial growth is taking place in an easterly direction from the Buffalo City line through the Town of Cheektowaga to the villages of Depew-Lancaster.

It is projected that by the year 2020, the first ring of towns around the City of Buffalo will be fully urbanized, consisting largely of urban residential and commercial development with heavy industry confined within the corridors mentioned above, and light industry confined to planned development areas. By this time the second ring of towns (Area C on Plate 3), including Pendleton, Clarence, Lancaster, Elma, and Aurora, will be suburbanized and partially developed.

#### 6. Environmental Setting

##### a. Geology, Topography and Physiography

The Buffalo Metropolitan Area is defined by the watersheds of Cattaraugus, Cazenovia, Buffalo, Cayuga, Johnson and Tonawanda Creeks, plus the area bounded by these watersheds and Lakes Erie and Ontario, and the Niagara River. This region is located in both the Erie-Ontario Lowlands and the Appalachian Uplands provinces of New York.

The topography of the region consists of a series of gently rolling plains interrupted by east-west striking escarpments as shown on Plate 4. The land ranges in elevation above mean sea level from approximately 600 feet in the northern area to 2,000 feet in the Appalachian Uplands.

The major geologic formations are shown on Plate 4. In the Buffalo Metropolitan Area the age of the bedrock follows a Paleozoic sedimentary sequence and ranges from the Lockport Group of the Middle Silurian through the Canadaway Group of the Upper Devonian. The rock formations are interbedded shales, siltstones, sandstones, limestones, and dolomites of varying thickness and sequence. Differential erosion left the more resistant rocks as escarpments, separating the low irregular surfaces of the more erodible rocks. The bedrock in the region has greatly influenced the Pleistocene geology.

During the Pleistocene age, the region was subjected to four major advances of glaciers which deposited glacial till as terminal and ground moraines covering the bedrock. In some areas where lakes were formed silts and clays were deposited over the glacial till. Subsequent erosion by the streams draining northwestward off the Allegheny Plateau and westward across the lowland plains developed the present topography.

#### b. Climate

The climate of the region in general is temperate, humid-continental with the chief characteristic of rapidly changing weather. The prevailing winds are from the southwest over Lake Erie.

The variation in amount of rainfall received across the region reflects physiographic influences. Average annual amounts reach 44 inches in the Appalachian Uplands in the southeastern portion of the region while the Erie-Ontario Lowlands in the northern portion of the region receive average annual rainfall amounts as low as 32 inches. The average annual precipitation for the region computed from long-term rainfall records at U. S. Weather Bureau gages is 37.4 inches. The rainfall amounts caused by storms does not vary significantly over the region. Flood producing storms are as likely to occur in the Erie-Ontario Lowlands as over the Appalachian Uplands even though average annual rainfall amounts are 12 inches less in the Lowlands.

The average annual snowfall experienced in the southern portion of the area is about twice that in the northern portion. All of the major streams in the region originate in the southern areas where the average snow depth is in excess of 90 inches per year.

The average annual temperature in the region is 46.9 degrees Fahrenheit with monthly temperatures ranging from 69.2 degrees Fahrenheit in July to 24.2 degrees Fahrenheit in January. The freezing period is generally from 5 to 6 months long.

#### c. Hydrology and Water Resources

Plate 5 shows the location of U.S.G.S. gaging stations throughout the

study area, and includes a summary of the characteristics of major streams and watersheds of the region.

Stream runoff patterns are significantly affected by the storage of moisture in the snow pack during the winter months. Although monthly precipitation in the form of rain or snow is generally uniform throughout the year, 40 percent of the annual runoff occurs during the spring months of March and April because of the combined effects of rain, frozen ground, and the release of moisture retained in the snow pack. In contrast to high spring runoff, monthly streamflows in the summer and early fall are much lower. Due to evapotranspiration, only a small percentage of the rainfall that occurs during these months appears as runoff in streams.

d. Classification of Streams

The New York State Department of Environmental Conservation (DEC) has a stream classification system which was developed to protect the highest and best use of the State's water resources. The DEC stream classification system includes the following categories:

Class AA Water Supply

Class A Water Supply

Class B Bathing

Class C Fishing

Class D Secondary Contact Recreation

The Niagara River has a Class A - Special classification because it is an international boundary water.

The classification of streams in the study area is shown on Plate 6. Very few streams in the region are classified as Class A streams. These are principally located in the southern portion of Erie County where population density and land use along the streams is light. Niagara County has only two Class A streams and both of these are beyond the projected 1990 area of urbanization.

As with Class A streams, there are also few Class B streams in the region, and these are mainly in Erie County. Sections of Cazenovia, Buffalo, Scajaquada, and Ellicott Creeks within the 1990 projected urbanized area are classified as Class B streams. Only three streams in Niagara County are Class B streams. The encroachment of urbanization is the greatest threat to present quality of the water of these streams.

Class C streams, which can be used for fishing, but not as a source of drinking water or for swimming are more numerous than are Class A or B streams. Class C streams are scattered throughout the region, however almost all of the streams in Niagara County and in central and western Erie County are Class D or Class C streams. It is interesting to note that some of the larger streams begin as Class B or C streams and eventually become Class D streams when they flow through urban areas.

#### e. Biological Resources

Fauna. The distribution of the wildlife resources is related to the two broad topographic divisions within the Buffalo Metropolitan Study Area. One of these is the Lake Plain, a relatively flat and fertile agricultural belt which is wide in the northern portion of the region but narrow in the south. The other is the Allegheny Plateau, an upland area of rolling hills and scattered woodland tracts interspersed with agricultural acreage. Generally, the Lake Plain supports a wildlife resource typical of that associated with agricultural development, while the heavily vegetated Allegheny Plateau predominantly supports a woodland type wildlife resource.

The northern and western part of the region, exclusive of urban and industrial zones, contains some of the best openland wildlife habitat in New York State. Extensive orchards, vineyards, and truck gardens are mixed with dairy farms and general farming areas. Swamps, marshes, woodlots, and old fields offer protective cover although there are some areas where cultivation is so intense that localized shortages do occur. The ring-necked pheasant and the cottontail rabbit are the two most important agricultural wildlife species. Natural reproduction of the former is good in this part of the region despite the fact that considerable stocking is still being performed. Squirrels are generally restricted to the farm woodlots. Other wildlife species including the woodchuck and fur bearers such as the skunk, red fox, and opossum are also found in this area.

Woodland wildlife in the region includes white-tailed deer, ruffed grouse, red and gray squirrels, snowshoe rabbit, wild turkey and occasionally bobcat. Deer, cottontail rabbit, red fox, raccoon, skunk, opossum, woodchuck and a variety of songbirds are found throughout the region, and frequent both woodland and openland vegetative cover types and peripheral areas around marshlands. Ruffed grouse, wild turkey and snowshoe rabbit populations are generally confined to the more heavily wooded southern portion of the region in Erie, Wyoming, Cattaraugus and Allegany Counties. Woodcock utilize grassy fields, meadows and lowland woods in the watershed for food and cover - particularly in the vicinity of more poorly drained soil types.

Aquatic wildlife in the region includes migratory waterfowl, shore and marsh birds, as well as aquatic and semi-aquatic fur bearers such as the muskrat, mink, racoon, and beaver. These species find suitable

habitat in the scattered marshes along the Niagara River and Lake Erie coastline. Numerous small marshes have also been created by the New York State Department of Environmental Conservation to increase the area of productive wetland for wildlife.

The fishery habitat of the region is quite diverse since it includes parts of two of the Great Lakes (Erie and Ontario), the Niagara River, and numerous tributary rivers and streams. Lake Erie, the shallowest of the Great Lakes and one of the most productive, supports an important sport fishery and to some extent a commercial fishery. Lake Ontario also supports a sport and commercial fishery. The Niagara River supports a well utilized sport fishery. Some of the most important fish species found in Lake Erie, Lake Ontario, and the Niagara River are the coho and chinook salmon, rainbow and steelhead trout, brown trout, northern pike, muskellunge, largemouth and smallmouth bass, yellow perch, and walleye. Many of these species, especially trout and salmonids are present because of the stocking program of the New York State Department of Environmental Conservation.

Most of the larger streams and creeks of the region originate in the rugged upland of the Allegheny Plateau and then flow across the Lake Plain to enter the Niagara River or Lake Erie. The upper reaches of some of these streams provide habitat for cold water species, while the lower portions generally support warm water fish species. Some of the important fish species found in the regional streams are coho and chinook salmon, brook, rainbow and brown trout, largemouth and smallmouth bass, pickerel, and yellow perch.

Flora. The Buffalo Metropolitan Area lies in the deciduous forest ecosystem of North America where both the northern and eastern hardwood forests occur. The northern hardwood forest includes almost all of Niagara County, much of southern Erie County and portions of Cattaraugus County. Maple-beech-birch is the characteristic climax vegetation of this area. The eastern hardwood forest extends southward from the northern one-half of Erie County, and includes a small part of southern Erie County, and parts of Cattaraugus County. This forest region contains two climax types - an elm-ash-cottonwood climax which occurs in the low lands of northern Erie County and an oak-hickory climax type which occurs in the high lands of extreme southern Erie County and parts of Cattaraugus County.

Along many of the streams in the region a variety of species are found which in part, reflects the alluvial nature of the soils. Black willow, American sycamore and eastern cottonwood are common riparian species.

A sugar maple-American beech-yellow birch association usually develops on the lower valley slopes, while the upper slopes support an oak-hickory climax forest in relatively undisturbed areas.

Much of the natural forest cover of the area has been removed by agricultural and other land use practices.

#### 7. Prior and Ongoing Studies and Reports

Prior and ongoing Corps of Engineers flood management studies in the Buffalo Metropolitan Area include:

a. Ellicott Creek Basin. A restudy of the Ellicott Creek flood management plan was completed in August 1973 and issued in the form of a summary, main report, seven appendices, and an environmental impact statement. This restudy resulted in the recommendation of a flood diversion channel. Extensive recreation proposals were included in the plan. The State of New York did not support this alternative. Subsequently, a reanalysis of channelization alternative was made resulting in selection of a plan which includes a combination of major channelization and diversion channel. Preparation of a Phase I GDM for this alternative is underway.

b. Scajaquada Creek Basin. The Phase I GDM presenting alternative designs for flood protection in the Buffalo Metropolitan Area along Scajaquada Creek was completed in November 1974. The recommended plan includes major channelization, levees, some floodproofing, sealing of manhole covers, and replacement of culverts. Recreation facilities in the form of bicycle paths and landscaping of project features are included in the plans.

c. Cayuga Creek Basin. A final feasibility study of flood management for the Cayuga Creek Watershed is presently underway.

d. Cazenovia Creek Basin. The feasibility study of flood management alternatives for the Cazenovia Creek watershed was prepared in March 1975. The recommended plan provides for a combination of flood plain management by local interests, participation in the National Flood Insurance Program and the construction of an ice retention structure.

e. Cattaraugus Creek Basin. Cattaraugus Creek, primarily a rural area, will be studied under a separate Congressional resolution dated June 1956. However, a project is authorized at the mouth of Cattaraugus Creek in the interest of safe recreational navigation and flood management. A considerable amount of hydrologic data has been developed which is available for the Cattaraugus Creek flood management studies.

f. Tonawanda Creek Basin. A Preliminary Feasibility Report on flood management in the Tonawanda Creek Watershed was completed in September 1975.

The Erie-Niagara Counties Regional Planning Board carries out an active program of planning studies in the Study area. Among their reports utilized in the study were the Regional Storm Drainage Management Plan, the Regional Recreation and Open Space Plan, the Land Use Concept Plan, and the Urban River report which presents a development plan for a portion of the Niagara River within the study area.

The Erie-Niagara Basin Regional Water Resources Planning Board developed a comprehensive Water Resources Plan for the Erie-Niagara Basin with the assistance of Harza Engineering Company in 1969. The plan presents a coordinated comprehensive development plan to meet the water resource needs of the basin through the year 2020.

The New York State Office of Parks and Recreation has published the Statewide comprehensive recreation plan entitled "Forecast of Outdoor Recreation in New York State - People, Resources, Recreation" in 1973. This report details Statewide recreation needs and plans, and includes an extensive inventory and analysis of basic recreation data.

The city of Buffalo, with the assistance of the consulting firm of L. S. Wegman Company, prepared a report which describes and documents the problems and needs of Delaware Park Lake and Lower Scajaquada Creek, and presents a range of alternative solutions.

The Great Lakes Basin Commission has completed a framework study of the Great Lakes Basin and the Buffalo Metropolitan Area is included in planning area 4.4. The final printing of 16 volumes has been completed, 11 volumes are being prepared and about 23 volumes are yet to be printed in final form.

## Chapter II

### NEEDS

#### 1. Introduction

The Buffalo Metropolitan study area, bounded by Lake Erie, the Niagara River, and Lake Ontario, and drained by an extensive network of streams, is well endowed with water resources that have large potential for beneficial use by the populous. Although studies in the past have dealt with flood control and water quality aspects of these water resources, interviews with individuals and groups, both private and Governmental, indicate that there remain significant and important potential resource areas that are undeveloped despite pressing need and demand. Implementation of plans in many areas of concern has been difficult.

This chapter describes overall needs and focuses attention on interest or problem areas of priority concern related to water oriented recreation, water-related environmental quality, fisheries development and streambank stabilization. The growth of the region and the Buffalo Metropolitan Area has been accompanied by the creation of many institutions and units of government with varied and conflicting concerns and responsibilities for development and use of the water resources and lands bordering streams and lakes. Concerns and needs of the citizenry have progressed from primary interest in water for drinking, transportation and power production, to industrial uses, and to use as a vehicle for waste disposal. Present-day concerns are with all of these uses plus major concerns that the resource also be aesthetic, provide good aquatic habitat, and be clean enough for recreational use.

With this fragmented responsibility and the changing perceptions of the citizenry of water as a resource, it is not surprising that development related to water has been unequal in the study areas and in the treatment of all uses. Concurrently with the uncoordinated development of the water and associated land resources, the Buffalo Metropolitan Area has grown in population to the point that demand for fishing and recreation opportunities within the urbanized area has outstripped accessible supply with consequent overdemand in underdeveloped and deteriorated areas, even where hazards to safety are apparent. Many reports on various aspects of basin needs have been prepared, and information from these reports and recent meetings assisted in determining basin needs.

#### 2. Overall Needs

The greatest water resource need is for facilities that represent a cohesive inter-related development of the recreation, fisheries and

related environmental quality potential of the waters of the area. To achieve this it is necessary that:

- a. Existing parks and facilities be upgraded and expanded to accommodate users in a safe and pleasant manner;
- b. The focal points for recreation be tied together and made accessible by several means such as bikeways, trails, waterborne ferries, public transportation, and private vehicles;
- c. The aesthetic and quality conditions of the waters be improved through programs for control of debris, drift, and streambank erosion.

### 3. Streambank Stabilization

The banks of many streams in the study area are being actively eroded. The upper reaches of the major streams in Erie County generally rise on the Allegheny Plateau. Their streambeds are generally in bedrock and they develop a large bed load consisting primarily of coarse gravel. The lower reaches of these streams are on the lake plains where the bank material is generally silt or clay loams interspersed with alluvium.

The streambanks that consist of loam soils are easily erodible. Differential erosion of the banks induces some meandering characteristics in the streams as they traverse the lake plains. Subsequent deposition of the heavy, gravel bed load along the inner portions of the stream bends reinforces the erosive action of the streams by deflecting the flow more directly into the eroding bank. This stream action takes place chiefly during flood flows so that extensive erosion is a gradual process.

Since 1944, about 4.6 million dollars in Federal funds have been used to develop and implement bank stabilization measures in the Buffalo River basin of the study area. The project, managed by the U.S. Soil Conservation Service (SCS) in cooperation with Erie and Wyoming Counties, is known as the Buffalo Creek Watershed Project. Measures such as drop structures, riprap, and vegetative plantings were provided and justified on the basis of reducing costs to maintain the Federal navigation channel in the Buffalo River. Records of the SCS indicate that the project has reduced volumes dredged from the river by about 40 percent. The SCS inspects and maintains the bank stabilization project with funding assistance from New York State and Erie and Wyoming Counties. The project, completed in 1963, covers about 58 miles of streambank.

In 1972 the rains which accompanied Hurricane Agnes caused extremely damaging floods. Extensive erosion of streambanks occurred in the Tonawanda Creek Watershed during those floods. Emergency relief

funds from the Federal Government were used to repair and stabilize eroded streambanks along Tonawanda Creek.

Extensive losses of soil and streambank, varying in amount from a fraction of an acre of land surface to several acres, occurs only during large flood events. Evidence of this can be seen in numerous highway relocations where secondary roads follow stream courses closely.

A field reconnaissance was made of selected stream reaches in the study area as shown on Plate 7. These areas were selected in consultation with the Soil Conservation Service, and are considered representative of conditions in the region as a whole. Sites where streambank erosion was evident and involved potential or actual damage to the adjacent land and their use were isolated with a fairly uniform distribution along the streams. These sites generally were at points of severe curvature of the stream. Several instances were noted where undercutting of high streambanks has produced slope failure and sloughing of large portions of the bank into the stream. At most sites where active streambank erosion is visually evident, obstructions of flow caused by fallen trees and shrub and tree growth encroaching on the high water stream channel can be seen immediately upstream of the eroding area.

The SCS has provided technical assistance to local interests in providing protection measures at points of special concern and has administered the programs described above. However, the SCS can only enter into project construction if the work is economically justified.

#### 4. Water-Related Environmental Quality

Urbanization has many effects on water related environmental quality due to land clearing and erosion, wastewater discharges, trash dumping, and discharges from sewer systems. These effects are evident in most of the urban streams in the region. As the urbanizing area around the city of Buffalo continues to expand, it has become increasingly important to recognize the value of the water-related environment and to implement protective and restorative measures.

Water-related environmental quality in the Buffalo Metropolitan Area concerns not only water quality (in terms of dissolved and suspended constituents), but also the uses of the water resource and the environmental surroundings of streams, rivers and lakes. It is expected that regional and urban water quality, particularly as it is affected by wastewater discharges will improve in the future as plans for pollution abatement are formulated and implemented in accordance with requirements of the Federal Water Pollution Control

Act. Proper land use planning, including open space and recreation planning along streams, is an important mechanism by which water-related environmental quality can be restored and preserved. The development of open and green space corridors along streams in the Buffalo Metropolitan Area was an important aspect of concepts advanced by the Regional Planning Board. These concepts as well as legislation to control water pollution were considered in this study.

Stream classification, discussed on page I-5 of Chapter I, will directly affect the future growth patterns of the study area by limiting the types, quality, and quantity of effluents entering the various streams.

##### 5. Regional Fishery Resource

The outlook for regional fishery resources is quite promising due to the vigorous three-part management program of the Department of Environmental Conservation of the State of New York. That organization pursues a program of stocking salmonids in the Great Lakes, trout in selected streams of the study area, and warm water species in a number of urban ponds. The Department also maintains fish hatcheries and has a program to obtain rights of access to streams for fishermen. The State Office of Parks and Recreation also participates in the cost of recreational boat harbors along Lakes Erie and Ontario in New York State. These harbors provide boat and pier fishing opportunities.

Although sufficient data concerning fishing demand and use for the region are not available to adequately quantify the present situation or predict future needs, discussions with fishermen, DEC personnel and others indicate that the regional fishery resource is improving and that the interest in and use of this resource will continue to grow.

The fishery resources for the study area consist of both native and stocked warm water and cold water species. Populations of northern pike, muskellunge, smallmouth and largemouth bass, yellow perch and walleye make up the major portion of native sport fishes in Lake Erie, Lake Ontario, the Niagara River and their tributaries. Native warm fishes such as pickerel, carp, suckers, channel catfish, bullheads, rock bass, white bass, sunfish, crappie and freshwater drum also are caught in the waters of the region.

Since 1968, the State of New York has been stocking hatchery-raised salmonids to re-establish Lake Erie and Lake Ontario sport fisheries. At the present time, the States of New York, Pennsylvania, Ohio, and Michigan and the Province of Ontario, Canada, are stocking salmonids in Lake Erie. New York stocked 335,000 salmonids

and trout in Lakes Erie and Ontario in 1975 as part of the Great Lakes stocking program (Plate 8). As a result of the ongoing stocking program, coho and chinook salmon, rainbow, steelhead, brown and lake trout, as well as splake (hybrids between brook trout and lake trout) are available to anglers fishing in the waters of the region. It is expected that New York's Great Lakes salmonid program will produce a mature sport fishery by 1978-1979.

The DEC stocks brown and rainbow trout in selected streams in the Erie-Niagara region. The streams stocked in 1975 are shown on Plate 9. Regional streams that are considered to be trout waters are listed on Plate 9. These are waters that are of sufficient present quality to support cold water fishes. Regional streams that support cold water species as well as those that support warm water species are illustrated on Plate 10.

The DEC also stocks selected urban ponds in Erie and Niagara Counties with calico bass (crappie). Approximately 12,000 calico bass were stocked in seven ponds in 1975 (Plate 8). These fishes provide a catch-out fishing opportunity primarily for urban youngsters.

The DEC operates several fish hatcheries from which fish are made available for lake or stream stocking. A new hatchery, the Great Lakes Salmonid Hatchery, is being planned to augment the present hatchery production. This new facility will make it possible to increase the level of salmonid stocking in Lake Ontario and Lake Erie.

In addition to the fish stocking activities, the DEC also conducts a stream rights acquisition program within the Erie-Niagara watershed. In this program, the DEC works with land owners to secure rights of access to quality trout streams in Erie, Chautauqua, Wyoming and Cattaraugus Counties. Approximately 33 miles of stream-bank access rights have been acquired in this program thus far. A summary of this program is provided on Plate 11.

New York State is also the cooperating agency for Corps small boat harbors along Lake Erie and Lake Ontario in New York State, for example, Cattaraugus Creek Harbor, NY. These harbors provide increased opportunity for pier and boat fishing.

#### 6. Water Related Recreation

Recreational resources are fairly well distributed throughout the study area (Plate 12). However, realization of maximum use and benefit from the abundant recreation resources in the urban area has not occurred primarily because of problems relating to access.

This portion of the study focuses entirely on the need for providing additional and improved access and structural improvements to facilities for safe use of the urban recreation resources. These needs were investigated with the objective of identifying measures that would require relatively small capital investments to improve recreational resources which are already in place.

The Niagara River waterfront was identified as the area in which the greatest needs, and also the greatest potential benefits exist. Three characteristics of the Niagara River make it an important recreational resource: 1) its scenic aspects; 2) the improving sport fishery resource; and, 3) the proximity of the waterfront to the densely urbanized Buffalo Metropolitan Area. For these reasons, this study concentrated upon the riverfront by first focusing on localized riverfront sites, and then connecting these sites into a riverfront recreational system.

Additions and improvements to recreational facilities in adjacent areas were also investigated. These areas included the Buffalo Outer Harbor, Cazenovia Creek, and Delaware Park Lake.

#### 7. Other Water Resource Needs

There are three other major needs that are already being actively dealt with in the region: wastewater management, water supply, and lake restoration.

The Erie and Niagara Counties Regional Planning Board (ENCRPB) has been designated by the State of New York as the 208 Water Quality Planning agency for the region. The 208 Areawide Waste Treatment Management Study which began in late 1975, will develop comprehensive alternative plans for meeting the water quality goals of the region. The ENCRPB has requested the Buffalo District to be a part of their Technical Advisory Committee for this study effort. Continuing coordination will be maintained with ENCRPB by the Buffalo District because of the Federal interest in reducing pollution to waterways.

Comprehensive studies of water supply needs in Erie and Niagara Counties were carried out in the late 1960's, and a water supply plan and program, which incorporates these studies, was adopted in 1973 by the Erie and Niagara Counties Regional Planning Board.

The decline in quality of Lake Erie has been well documented and publicized. The study area lies on the eastern terminus of the Lake, and the lake is one of the most valuable water resources in the area. Thus the restoration of the Lake is an important water resource need in the study area. At the present time, the Buffalo District, Corps of Engineers, is conducting the Lake Erie Wastewater Management Study to determine what is required to clean up and rehabilitate Lake Erie water quality. The Preliminary Feasibility Report for this study effort will be published in early 1976.

## 8. Some Specific Needs

Areas with specific needs were identified at the outset of the study, and specific investigations are described in the following paragraphs:

a. Bird Island Pier is a two-mile long breakwater and retention wall paralleling the U.S. side of the Niagara River Shoreline. The pier and Black Rock Lock control navigation water depths in the Black Rock Channel. The pier from opposite Albany Street to opposite Porter Avenue is constructed of masonry and rubble with the top elevation near Black Rock channel water level. It has deteriorated into an unsafe condition but despite this it attracts fishermen. There have been a number of drownings by persons who fell or were swept from the pier into the fast-flowing Niagara River. In 1975, two persons drowned when they slipped from the pier into the Niagara River, and several persons were rescued from the pier where they had become trapped by wind-driven high water. Past experience indicates that there is little likelihood that continued use of this facility for fishing can be restricted effectively. There is, therefore, a need to upgrade the pier to provide for relatively safe access and to provide necessary warning and control facilities to assure that users are aware of adverse weather and lake conditions. Several sections of the pier are deteriorating and will require remedial work regardless of the upgrading for recreational purposes. Plate 25 illustrates the pier and the dangerous situation. The remainder of the pier from opposite Porter Avenue to opposite Virginia Street is in good condition and would only require guard rails and steps to make it safe for public use and access.

b. The Niagara Riverfront. Almost the entire riverfront in Buffalo and Town of Tonawanda is inaccessible for strolling or other recreational pursuits. The multilane New York State Thruway was built in close proximity to the river bank thus restricting both available land and access. In several areas where sizeable land areas still abut the shoreline, they are occupied by industrial establishments or are being used for municipal functions such as the wastewater treatment plants and the sanitary land fill operation on Squaw Island. There still is a considerable potential and demand for both short and long term developments along this beautiful and important river. This is attested to by the fact that during this study small children were seen hazarding a crossing of the thruway to visit the river's edge near Riverside Park. Plate 26 illustrates the difficult access to the shoreline near Riverside Park.

There is a need to provide facilities and means of access to the riverfront area for potential users, especially the nearby urban dwellers. In addition, it is important that areas such as Squaw

Island be at least partially devoted to open space use and that existing interior areas such as Riverside Park be reintegrated into a riverfront recreational complex.

c. Scajaquada Creek and Delaware Park. Scajaquada Creek is the only creek of the area whose watershed is entirely within the urbanized area. It has most of the problems which beset urban streams. There is flooding and water quality is very poor due to sewer overflows and careless disposal of solid wastes and debris along the banks. However, flooding conditions upstream are to be greatly alleviated by a Corps of Engineers project for channel improvements to Scajaguada Creek and Tributaries, NY. The central reach of the stream passes through a four-mile long tunnel constructed some 40 years ago. In the beautiful downstream reach, the city of Buffalo plans to divert the creek around Delaware Park Lake to permit control of lake water quality. The lake presently acts as a trap for stream-borne sediments and debris. Therefore, this study addresses the issues of control or disposition of sediments and debris in Scajaquada Creek. The integration of Delaware Park into the overall Metropolitan recreational and fisheries program also was investigated.

d. NFTA Small Boat Harbor. The need for rehabilitation and expansion of the Niagara Frontier Transportation Authority (NFTA) Small Boat Harbor, located in the Buffalo Outer Harbor, as an integral part of overall Metropolitan area recreation facilities was investigated. Plate 27 shows the present condition of the Small Boat Harbor dike.

Excessive wave action in the city of Buffalo's Erie Basin Marina was investigated but no solution was determined. However, shore protection work along LaSalle Park may help absorb some of the wave energy reflected into the Marina if stone riprap is placed along the LaSalle Park wall.

e. The relationship of the several Federal flood control projects to the area's recreational resources was assessed, and compatible measures needed to enhance the relationship were identified. In addition to the Scajaquada Creek improvement, projects for Cazenovia, Cayuga, Ellicott and Cattaraugus Creeks were reviewed.

Measures to satisfy these needs individually and regionally were evaluated and a comprehensive plan was formulated which can be implemented as rapidly as funds become available. Non-Federal agencies can apply for Federal assistance to construct the facilities or to continue planning.

## Chapter III

### THE DEVELOPMENT PLAN

#### 1. The Development Plan

The development plan is a combination of recreational facilities development, identified for specific locations, and suggested administrative measures which, when implemented, would provide region-wide benefits. As shown on Table 1, development costs total \$5.1 million with equivalent average annual costs of \$1.04 million and annual benefits of approximately \$3.7 million. The benefit to cost ratio for full development is 3.5:1.0.

A design concept and costs were developed for each element of a measure, such as bike paths and picnic areas. Unit costs were derived from two primary sources; "Building Construction Cost Data", 1974, R. S. Means Company, and cost data for similar recreational developments.

Neither costs nor benefits were developed for the region-wide measures of streambank stabilization and debris control since the degree to which financial outlays for project type works will be required depends largely on the effective use of police powers and timely implementation of maintenance measures. The Federal Government does not have authority to fund drift and debris removal in the Buffalo Metropolitan Area. Measures to implement fisheries improvements are important recreational aspects of the focal point areas, but neither costs nor benefits for these improvements were developed. However, expanded urban fishing access and stocking require the availability of funds and new policy initiatives designed to concentrate upon development of an urban fishery, in addition to the present emphasis on high value sport fisheries.

#### 2. Regional Programs

The regional assessment indicated that: 1) streambank stabilization normally is costly and difficult to justify according to Federal criteria, but an opportunity exists for implementing management measures to facilitate early detection and relief of problems which must be dealt with regardless of costs; 2) even though there is a lack of scientific data on fisheries and their use, there is a dynamic fish stocking program which needs to be expanded in the urban area and to be supported by providing better access and opportunities for users; 3) water-related environmental quality should improve as requirements of the Federal Water Pollution Control Act are implemented, and when a companion, regionwide management program to reduce the quantities of floating trash and debris is effectively implemented; and 4) the greatest need for improving water oriented recreation opportunity is in the immediate Buffalo Metropolitan Area along the Niagara River.

Table 1  
DEVELOPMENT PLAN\*

Location	Measure	Total Costs	Development Costs	Annual Costs <sup>1/</sup>	Annual Benefits	Equivalent Benefits	Benefit-Cost Ratio
Riverside Park, Buffalo to Tonawanda	C Park Construction, Bicycle Path, Walkway Overpass, Parking, and Picnic Area	: 1,293,000	: 316,000	: 1,454,000	: :	: 4.6	:
Squaw Island and Bird Island Pier	B Pier Rehabilitation, Bicycle Path, Parking, Park Development	: 1,270,000	: 163,000	: 491,000	: :	: :	:
Erie Basin Marina to LaSalle Park and Day's Point	B Shore Protection in LaSalle Park Bicycle Path, Day's Point Parking	: 292,000	: 47,000	: 365,000	: 7.8	: :	:
NFTA Small Boat Harbor	C Boat Slips, Bicycle Path, Parking, Park Development, Picnic Area	: 1,978,500	: 264,800	: 539,000	: :	: :	:
Waterfront Ferry Service	Two 25-Passenger Boats	: 165,000	: 55,000	: 66,000	: 1.2	: :	:
Delaware Park Lake	Two Extensions of Existing Bicycle Path System	: 37,000	: 34,000	: 382,000	: 11.2	: :	:
Control of Floating Drift and Streambank Debris	Increased Cost to C of E for Maintenance of Black Rock Lock and Channel if Delaware Park Lane is Bypassed	: 12,000	: :	: :	: :	: :	:
Cazenovia Creek	Hiking and Nature Trail, Bicycle Path to Cazenovia Park	: 59,600	: 45,200	: 406,100	: 9.0	: :	:
TOTAL for the DEVELOPMENT PLAN	: :	: 5,095,100	: 1,043,500	: 3,703,100	: 3.5	: :	:

\* See Chapter V, pages 1-4 inclusive, and plate 24 for cost-benefit data and relationship of B and C to other phases of development.

1/ Approximately one-half of the equivalent annual costs are attributable to operation and maintenance of recreation facilities. If these facilities are operated on a regional basis, operation and maintenance costs likely would be less due to economy of scale.

### 3. Streambank Stabilization Program

Benefits from a project of streambank stabilization are varied and considerable, but it is difficult to convincingly identify and quantify them. For conditions prevailing in the study area, benefits accrue from prevention of land loss and structural damages, water quality improvement, decreased downstream sedimentation and dredging costs, and reduction of flooding caused by reduction of channel capacities and ice jamming at sediment bars. Often, however, in the rural upland areas once a streambank erosion problem has fully developed, identifiable benefits are small when compared to the costly measures required.

In order to deal with the problem, which is a pressing one at least at the local level, a cooperative program of surveillance, maintenance, engineering, and construction should be implemented, with continuing participation by U.S. Soil Conservation Service, State and local interests.

It may be desirable to form a standing board such as a County Watershed District which would meet at scheduled intervals, perhaps four times annually, to initiate and review cooperative action. Local authorities would provide personnel to make biannual inspections of main and large tributary channels to locate fallen trees, and sediment bars forming at curves. These inspections would be made following the spring flood season, and prior to the winter freeze and following any unusually large floods. If obstructions and erosive conditions were noted, personnel and equipment would be drawn from regular local and State maintenance forces to correct the situation before a serious erosion problem could develop. Should a developing condition require substantial remedial works, then the U.S. Soil Conservation Service, and the State DEC, individually or in combination, could provide engineering, and construction management assistance to the local interests. Earlier experience with regional problems and broader national experience would be drawn upon.

SCS personnel indicate that vegetative plantings have been largely unsuccessful as a primary bank stabilization measure on most study area streams. Because of the steep stream gradients, these plantings are usually destroyed after a few large flood events even when such plantings have become well established.

The measure that has provided the most success in the past has been the construction of a low bench or terrace replacing the eroding streambank. These benches are faced with riprap, and the toe of the benches are constructed of large stone sufficient to prevent undercutting by the stream.

In some cases, if the general public would benefit and construction is economically justified, State and Federal funds allocated to the

U. S. Soil Conservation Service could be used to defray costs. Since benefits from such a program accrue regionally as well as locally, non-Federal costs for this program should be shared amongst several jurisdictions and levels of government.

#### 4. Program for Maintenance of Water Related Environmental Quality

The primary unmet need is to implement a coordinated areawide program to reduce or eliminate the large amounts of unsightly floating debris which collect in pools and backwater areas. Collection and removal of debris from streams and along streambanks is a difficult and costly process. Since considerable amounts of this debris and trash are initially deposited on streambanks by human activity, there should be a program to reduce or eliminate debris dumping.

This problem should be solved by increased enforcement of existing laws related to the deposition of material on or near streambanks by an agency such as a County Watershed District, and by a regular program of streambank maintenance directed toward preventing debris and trash from entering streams. Cooperative arrangements among the local and regional jurisdictions would be required to carry out such a program. Each community would exercise its police power. Removal of natural debris or that illegally dumped would be coordinated at the county level. The work could be carried out with crews and equipment obtained from a variety of jurisdictions on the basis of availability. Since the benefits from such a program accrue regionally as well as locally, costs for this financially modest program could be shared by several jurisdictions and levels of government. A study of collection and removal of floating drift in Buffalo Harbor, NY, Black Rock Channel and Tonawanda Harbor, NY, Niagara River, NY and Tributary Waterways was completed by the Corps in 1965, and the benefit-cost ratio at that time was 1.2 to 1. The project was not authorized because Federal policy at that time did not consider debris and drift removal, mostly in the interest of recreational navigation, a Federal responsibility.

#### 5. Program for Enhancement of Fisheries

While the total fisheries program of the State is impressive, it is oriented essentially to high value cold water game fish with only minor input to the urban warm water fishery. The situation is partially fostered by the generally poor water quality of streams in the urban area. Perhaps the most immediate and urgent problem in the urban areas is that of boat and land access to the fishery, whether on the lakes, the Niagara River, or the various streams of the region. However, the proposals discussed in this report for a well integrated system of parks and recreation areas will provide access to enough desirable fishing areas to satisfy much of the demand.

It is necessary that the quality of urban streams and water bodies such as the Delaware Park Lake be investigated to determine the potential for immediate stocking. As noted earlier it is expected that quality of water in the urban streams will improve gradually with implementation of requirements of the Federal Water Pollution Control Act. The water quality requirements of the fishery resource should play an important part in comprehensive water quality planning. When the quality of water in streams, which can not at present support a fishery, improves sufficiently, the streams should be included in the stocking program of the New York State Department of Environmental Conservation.

A very important program, required before full fisheries development can be implemented, involves collection of the basic data which is essential for the analyses of fishery potential and demand. Such a program should be coordinated with the U. S. Fish and Wildlife Service and New York State Department of Environmental Conservation.

#### 6. Buffalo Metropolitan Area Waterfront Improvement Requirements

The Lake Erie and Niagara River waterfront forms the western boundary of the densely populated urban area and extends for approximately 30 miles from the city of Lackawanna northward to the city of Niagara Falls (Plate 13, Sheet 1).

From the Buffalo Outer Harbor north to Tonawanda there are four general areas that serve as focal points for water oriented recreational development: the Riverside Park area; Bird Island Pier and Squaw Island; the area from the Erie Basin Marina north to Day's Point; and the Niagara Frontier Transportation Authority (NFTA) Small Boat Harbor. Approximately four miles north of the Riverside Park area, existing Isleview Park and Nia-Wanda Park encompass over two miles of Niagara River shoreline extending to the city of Tonawanda. These adjacent parks comprise the largest existing shoreline development in the urban area, and lie near the northern fringe of the densely populated urban area.

Approximately 2 miles northwest of the Riverside Park area is Grand Island which divides the Niagara River into two channels. At the south end of this island is Beaver Island State Park, a large fully developed multiple purpose recreation facility within sight of the city of Buffalo. This park is accessible by automobile from the Buffalo Metropolitan Area via the Grand Island Bridge. While the park is only two to three miles in travel distance from the central city by water, it is approximately 15 miles by automobile. The State Park is a focal point for increased use of existing recreational development by the urban area populous if convenient access by water is provided.

Facilities at the focal point areas, exclusive of Beaver Island State Park, are either in need of rehabilitation to improve attractiveness and safety, or are practically non-existent. Access is limited in the case of Riverside Park, hazardous and difficult in the case of Bird Island Pier, and difficult in the case of the Erie Basin Marina to the Day's Point area and the NFTA Small Boat Harbor. In spite of the fragmentation of land use, it is possible to provide a cohesiveness to the waterfront by connecting the focal areas, and a diversity of experience by developing the unique characteristics of each focal area.

The remainder of this Chapter discusses, in some detail, measures proposed as part of the development plan in terms of the focal areas discussed above. Sheet 2 of Plate 13 is an index map to other plates that describe the improvement measures. Many of the measures are an extension of Studies conducted by the Erie-Niagara Counties Regional Planning Board and published in the "Urban River" report.

#### 7. Waterfront Access System

The Lake Erie-Niagara waterfront is a nearly linear north-south strip bounded by the Niagara River to the west and the Buffalo Metropolitan Area on the east. However, the waterfront is separated from the urban population by limited access highways along most of its length. In the vicinity of the focal areas, underpasses at Ontario and West Ferry Streets and at Porter Avenue provide access to the waterfront areas. In the case of the Erie Basin Marina and the NFTA Small Boat Harbor, access is limited to a circuitous and unmarked route over several local streets. Parking is limited in each area and on neighboring local streets. The Beaver Island State Park is usually reached by automobile via the NYS Thruway Grand Island Bridge and local roads on Grand Island.

The fragmented focal areas may be linked together by a water route along the Niagara River and a land route in the form of a bike path that extends from the Isleview - Nia-Wanda park area on the north to the NFTA Small Boat Harbor on the south (Plate 14). This system provides a continuity and cohesiveness to the entire waterfront in spite of the fragmented distribution of fishing and recreation areas, and it emphasizes a mix of public transportation modes (buses, ferries, bicycles, and walking).

The waterfront ferry system is a multiple purpose facility providing access to waterfront use areas, pleasure touring, and direct, short, and inexpensive access to Beaver Island State Park for the large urban population.

As illustrated on Sheets 1-7, of Plate 15, the proposed ferry would make nine stops between the NFTA Small Boat Harbor and Beaver Island State Park, including a stop at Strawberry Island for fisherman access. Two 25-passenger boats operating during the summer season would improve overall waterfront access by linking parks, marinas and other shoreline facilities to each other, and provide an excellent and attractive touring experience.

The ferry stops have been located to provide access to waterfront focal areas and to connect at convenient points with existing public transportation facilities that serve the entire Buffalo Metropolitan area.

Continuity and cohesion in waterfront development is provided on the land side of the waterfront by a bicycle path system extending from the Isleview and Nia-Wanda Park area southward to the NFTA Small Boat Harbor, as illustrated on Plate 14, and in detail on Sheets 1-7 of Plate 15. The proposed bikeway system is compatible with the existing city of Buffalo bikeway system and would be compatible with the city's proposed bikeway routes.

Efforts have been concentrated in this study on providing a high quality bicycle system separated from pedestrians and automobiles in order to maximize safety and recreational experience. Whenever possible, the bicycle path would extend along the waterfront and through pleasing environments such as Sheridan Park and Two-Mile Creek road in Tonawanda.

The bicycle path would be asphalt surfaced with gravel subbase and drainage facilities. It would be two-way, eight feet wide and provided with painted lines. The entire system provides an exceptional touring and pleasure riding experience, as illustrated on Plate 28, and would serve to connect and provide access to focal areas where other recreational opportunities including fishing are available.

#### 8. Riverside Park

The Riverside Park area is located at the northern edge of the city of Buffalo on the Niagara River. This stretch of waterfront is of great historical and cultural significance. It is part of the strip of land originally deeded to the British Governor of New York in 1764 by the Seneca Indians. In 1898, Frederick Law Olmsted, the famous landscape architect, developed a plan for the Riverside area that was combined with the Erie Canal by pedestrian access and boat ramps. In the 1930's the area was reconstructed and became a recreational area with an almost resort like quality. The entire area sits on a low bluff above the river at a point where it widens considerably before forming two channels to flow around Grand Island. It commands a broad and exciting

view of the Niagara River and Grand Island. The current slows considerably for some distance out from the shoreline, and the area is a popular and successful fishing area.

In the 1950's, the New York State Thruway was constructed along the river severing Riverside Park from the Niagara River, leaving only a narrow strip of land along the shore (Plate 16). The only access to the shoreline that remains is the Ontario Street underpass at the southern end of the area where a public boat launching and parking area exists. The shoreline stretches for over 7,000 feet northward from this point to the water treatment facilities and private industrial land. A narrow roadway extends northward from the Ontario Street boat launch for approximately 2,000 feet. The shoreline is undeveloped and exposed to the traffic noise and hazards of the Thruway. Access by crossing the Thruway is extremely hazardous although there is ample evidence that this method is in regular use (Plate 26).

A pedestrian bridge is proposed to connect Riverside Park with the shoreline at Vulcan Street. The Vulcan and Niagara Street intersection is controlled by traffic lights, and the pedestrian bridge would be at grade at this intersection, then pass over the thruway and descend to the shoreline. This pedestrian access bridge would safely connect a large residential and park area to the approximate center of the shoreline area. Additional parking could be developed adjacent to existing Riverside Park to provide access via the pedestrian bridge for residents who must travel longer distances by auto. Buses stop at Vulcan and Niagara Streets.

It is also proposed that the Niagara River shoreline could be extended by filling the river to a maximum distance of approximately 400 feet from the existing shoreline as illustrated by Alternative C on Plate 16. The fill would create approximately 22 acres of additional parkland. The fill could be retained by a sloping stair step wall constructed of quarry stone that is underlain by stable fill material. This type of bulkhead is nearly 50 percent cheaper than steel sheet piling and provides a superior shoreline from the point of view of aesthetics and river access. The International Joint Commission would have to review this plan and all plans for filling in the Niagara River to determine the impact on flows. The Commission must approve all plans before construction begins.

Facilities would be provided for day-use activities including picnicking, bicycling, walking for pleasure, and fishing. Suitable landscaping would be provided to create a pleasing park environment, including a hedge screen between the Thruway and the waterfront area.

## 9. Bird Island Pier - Squaw Island

The Niagara River flows steeply and rapidly through a narrow channel as it leaves Lake Erie (Plate 17). A Federal navigation channel and lock are located in this reach to facilitate commercial navigation. The river side of the navigation channel is formed by Bird Island Pier and Squaw Island.

Section A of Bird Island Pier was built in the early 1820's and rebuilt several times up to 1937. Section B was originally constructed in the late 1800's and the superstructure of reinforced concrete was added in 1929. Section C was added in the period 1928 to 1938. The Pier stretches for 10,500 feet from the tip of Squaw Island south into Lake Erie. This man-made shoreline is an excellent and popular fishing area. The pier is part of the Black Rock Channel - Tonawanda Harbor, NY, Navigation Project.

The pier is fully exposed to the weather approaching from Lake Erie that includes a wind fetch of over 200 miles. The Great Lakes are noted for the sudden development of violent rain squalls and thunderstorms, and fishermen or strollers on the pier are fully exposed to the wind, rain, and waves. A number of people have slipped or been swept off the pier and drowned. The surface of the pier, especially in Section A which is the most accessible, has deteriorated to an unsafe and hazardous condition.

It is proposed that measures for access by fishermen and people wishing to walk on the pier be provided as shown on Plate 17. Section A has a length of 6,600 feet and would be provided with an 8-foot wide reinforced concrete walkway with a railing on the Niagara River side. Sections B and C, comprising the remaining 3,900 feet of the pier, would be provided with removable handrails on both sides of the available walkway area. In addition, steel stairs extending over the cone shaped center section of the pier would be placed every 300 feet on pier Section B and at the intersection of pier Sections B and C. This approach provides reasonable safety and emphasizes the aesthetic relationship of the pier, the Niagara River and the park lands that lie directly across the Black Rock Channel (LaSalle Park and Day's Point). Safe use of the pier could be enhanced by developing a hazardous weather warning system. Warnings could be signaled by the use of coded flags in much the same manner as is presently done in both harbors and marinas.

Plate 18 shows a table of elevations of Lake Erie at the upstream end of the pier, and a cross section looking south and passing through LaSalle Park, Black Rock Channel, and the Bird Island Pier. The improvements described above maintain the visual relationships that presently exist.

Plate 19 shows an alternative improvement in which safety is maximized. It consists of placing a superstructure on pier Sections B and C. Although the walkway is shown to be approximately 8 feet above the top of the pier, it could be considerably lower than that for aesthetic purposes when finally designed. In addition to pier rehabilitation, this measure includes a fill for park development along the Black Rock Canal side of the pier across from LaSalle Park (Plate 17). The seven-acre park would serve users of the pier and others interested in activities such as picnicking and walking for pleasure. The island fill would be connected to Day's Point with the Riverfront ferry service. The shallow water on the canal side of the fill would continue to function as a transient anchorage area for small boats. This new park land, while providing a unique recreational experience despite its modest size, would constitute a significant safety improvement. In the event of a sudden onset of hazardous weather, the distance a fisherman would have to travel to safety would be reduced by 50 percent on Section A and by approximately 60 percent on Sections B and C. Included in this measure is an expansion of parking facilities at Broderick Park where the pier joins Squaw Island. The city of Buffalo is presently improving Broderick Park by improving the parking, planting trees, and providing picnic tables. A surfaced bicycle path would be developed along the Niagara River side of Squaw Island, terminating at the proposed waterfront ferry landing above the Black Rock Lock.

#### 10. Erie Basin Marina - LaSalle Park - Day's Point

This focal area consists of three adjacent areas close to downtown Buffalo and are shown on Sheets 5 and 6 of Plate 15.

The Erie Basin Marina is a large facility owned by the City of Buffalo and presently used only for mooring pleasure craft. It is surrounded by considerable open space and commands an uninterrupted view of Lake Erie and the entrance to the Niagara River. This area is not yet developed for general public use although it is City policy to do so in the future.

The existing LaSalle Park extends approximately 4,000 feet along the entrance to Black Rock Channel. Near its south end, an abandoned sea plane landing area is used for boat launching. Aside from the riverfront park land in Tonawanda, it represents the largest existing waterfront park land. The bulkhead protecting it from the waters of Black Rock Channel and Lake Erie however is badly eroded.

Day's Point is a small area north of, but not contiguous to, LaSalle Park. This area is of some historical significance since it is the last vestige of the Erie Canal. At a small bay the Erie Canal ran inland toward downtown Buffalo. The area has been largely forgotten except by fishermen.

The City of Buffalo is clearly moving forward in terms of policy to develop the recreation and fishing potential of Erie Basin Marina and LaSalle Park. What is needed is a unifying facility such as a bicycle path and some basic improvement measures to make the focal area more attractive.

It is proposed that a surfaced bicycle path linking the Erie Basin Marina with LaSalle Park and Day's Point, a ferry landing at the Marina and Day's Point, and parking expansion at Day's Point be constructed where shown on Sheets 5 and 6 of Plate 15. Access improvements would be complemented by the provision of water safety equipment and security fencing currently being installed at the Marina. Also recommended is the removal of the shoreline fencing at LaSalle Park.

A rock stepwall along the Black Rock Canal in LaSalle Park similar to that proposed at Riverside park should be constructed as a replacement for deteriorating existing wall. Such a wall would serve to both improve fisherman access and use of the canal, and to dissipate the wave energy which is currently contributing to shoreline erosion at LaSalle Park and possibly the turbulence in the Erie Basin Marina. The City of Buffalo is developing plans for repairing the wall.

#### 11. NFTA Small Boat Harbor

At the southern extremity of the waterfront lies the Niagara Frontier Transportation Authority (NFTA) Small Boat Harbor located in the Buffalo Outer Harbor (Plate 20).

To the south of this area lies a concentration of very heavy industry, and to the north the land is developed for waterfront commercial and industrial use. New York State Route 5 passes within 400 feet of the Small Boat Harbor. Across the highway from the Small Boat Harbor lies a large undeveloped tract of land known as Tifft Farm which, through a unique combination of public and private development that relies primarily on donated labor and materials, is to be developed into an extraordinary nature preserve. Adjacent to the Small Boat Harbor is a diked area of approximately 20 acres that is used to dispose of dredging spoil. The spoil area will be filled soon and be available for public use.

The NFTA Small Boat Harbor is clearly isolated and its condition reflects some need for repair. The dikes enclosing the harbor have deteriorated badly and have been maintained by placing broken pieces of pavement and other random fill material on the original dike. The mooring spaces and the harbor generally lack some of the basic facilities that they should have. In spite of the condition, demand for use of the harbor is very high. In contrast to the Erie Basin Marina which has been unable to fill its capacity, there is an excess

of demand at the Small Boat Harbor. The Erie Basin Marina is a more impressive and elaborate facility but moorage fees are more expensive and the mooring area experiences some severe turbulence problems.

The fishing demand in the NFTA Small Boat Harbor is great, but fisherman must negotiate the hazardous dike.

It is proposed that additional recreational land be created by filling 28 acres outside of the existing Small Boat Harbor as shown on Plate 20. The outer bulkhead of this fill would consist of a sloping stairstep wall constructed of quarry stone that is underlain by stable fill material similar to that proposed at Riverside and LaSalle Parks. New recreational land would also be created by a six-acre landfill within the Small Boat Harbor. The 20-acre experimental dredge disposal site could be added to these landfills to create a 54-acre waterfront park which would support an extensive recreation program including facilities for picnicking, bicycling, walking, fishing, boat launching and additional marina slips for mooring.

A new bike path 1.7 miles in length is included in this measure and extends from Fuhrmann Boulevard through the new park land and connects this area to the proposed Tiffet Farm Nature Preserve. The implementation of this measure would provide a highly complementary recreation resource to the proposed nature preserve.

#### 12. Delaware Park Lake

Delaware Park Lake is situated on lower Scajquada Creek in Delaware Park in the City of Buffalo. Delaware Park is a large and beautiful multiple-purpose urban park with Delaware Park Lake as its focal point. A smaller lake, called North Bay or Mirror Lake is situated just downstream and immediately adjacent to Delaware Park Lake. The lake and park were designed by Frederick Law Olmsted in the late 1800's and was at that time a mecca for individual and group recreation.

The lake is situated on Scajquada Creek whose entire watershed is urbanized. The creek rises east of Buffalo in the town of Lancaster, flows westerly through the urbanized town of Cheektowaga and enters a 4-mile long conduit at the eastern boundary of the city of Buffalo. It exits from the tunnel and flows thru Forest Lawn Cemetery for approximately 3,000 feet before entering Delaware Park Lake. The creek carries large amounts of sediment, debris and trash, and sewage. Just before the Scajquada conduit ends, there is a diversion covered by a trash rack which diverts Scajquada Creek flows into the Delevan Avenue drain where it is carried to the Black Rock channel. This trash rack clogs repeatedly allowing the sediment, debris and trash, and sewage to flow directly into Delaware Park Lake.

Preservation and rehabilitation of this extraordinary resource has been given the highest priority by the city of Buffalo which recently completed a study of alternative measures to improve the lake. The adopted alternative, which is now being designed by the consulting firm of L. S. Wegman Company, involves diversion of Scajaquada Creek around the north side of the lake in a covered conduit. Trash and debris which will be bypassed around the lake will flow directly into Black Rock Channel. Any problems this may cause through increased shoaling in the navigation channel and accumulation of debris and drift in Black Rock Lock will be taken care of by the Corps of Engineers while carrying out normal maintenance and operations responsibilities.

As shown on Sheet 4 of Plate 15, a bicycle path connecting with an existing city of Buffalo bicycle path is proposed along the bypass and extending down Scajaquada Creek. The south shore of Delaware Park Lake is steep, bare, and unsightly, and should be seeded and regraded during the lake rehabilitation to a 1 on 4 slope. Plate 29 illustrates a portion of the proposed route for the Delaware Park bicycle path system.

When the lake is bypassed, flood flows will still enter the lake for events generated by storms with recurrence intervals of 10 years or greater. While the bypass will provide some control of water quality in the lake, the bypass alternative can not entirely alleviate the deposition of sediment, debris and trash, and sewage into the lake.

While the only feasible method of preventing sewage and sediment from entering the Lake is to prevent either from entering the stream, two alternatives appear feasible for preventing trash and debris from entering the Lake: a) collect the trash on a screen before it enters the lake, or b) prevent it from entering the stream.

It has been suggested by Erie County that a trash rack be built at the head of the Scajaquada conduit near the eastern boundary of the city of Buffalo. This location is at the downstream end of a proposed flood control project on Scajaquada Creek that eliminates flooding in the town of Cheektowaga. If the trash rack were to clog with debris, it would behave like a dam, significantly raising the flood stage upstream and causing flood damages. The design criteria for such a trash rack would have to be stringent in order to not allow this situation to occur. Thus the trash rack would have to incorporate either expensive automatic cleaning mechanisms that would have to be regularly maintained, or be of a type that would collapse if it became clogged and impounded water to a level that would result in flood damages. The County recognized possible adverse effects of constructing a trash rack on Scajaquada Creek near Buffalo and requested the Corps to investigate the feasibility of constructing trash racks further

upstream as part of the Corps of Engineers flood control project; one on the main stem, and one on each of the tributaries. City of Buffalo officials stated that the proposed trash rack near Buffalo is a necessary part of the City's plan to construct a bypass conduit around Delaware Park Lake. A final agreement has not been reached on the location or advisability of constructing any of the trash racks.

The second alternative would solve the problem of debris and trash at its source by a vigorous program preventing its accumulation on streambanks, whether deposited there by man or natural processes, and by a regular program of clearing and cleaning of streambanks and streambeds. This problem recurs throughout the Buffalo Metropolitan Area and in fact might even be considered characteristic of urbanized areas. The approach to this pressing problem is similar to that suggested for the problem of streambank stabilization as described earlier in Section 3 of this chapter.

The problem of sewage and water quality in Scajaquada Creek is being taken care of by the Town of Cheektowaga and the Buffalo Sewer Authority. Prospects are excellent for greatly improved water quality in the future.

Sediment problems may be mitigated by improved urban land use practices. The flood control project on upper Scajaquada Creek will contribute significantly in this regard since it involves extensive channelization and levees whose slopes and banks will be stabilized to prevent erosion.

### 13. Cazenovia Creek

The Erie-Niagara Counties Regional Planning Board (ENCRPB) has adopted a regional open space and recreation plan which envisions the streams which traverse the Buffalo Metropolitan area as environmental corridors, providing open and green space, and diverse recreational opportunity. Full implementation of this concept must necessarily await greatly improved water quality, but much may be accomplished toward these goals through planning and management of the land adjacent to the streams.

The ENCRPB plan will likely encounter the most difficulty in implementation where streams traverse the areas of greatest urban development such as that which presently exists along the Buffalo River and lower Cazenovia Creek. Along these stream reaches residential and commercial development, and in some cases industrial development, is dense and often encroaches on the stream channel. Little or no adjacent land is available and the streams are channelized in many cases. But there remain long stream reaches on Ellicott, Cayuga, Buffalo, and Cazenovia Creeks that lie within the area of projected

urbanization, and along which existing development does not preclude implementation of the open space plan.

Flood management study areas along the above mentioned streams were examined from the standpoint of the open space plan and the objectives toward which this study is directed. Studies on Ellicott, Scaj aquada, Cazenovia, and Cayuga Creeks incorporate measures which would achieve the objectives of the present study. In none of the cases is implementation of the open space plan goals precluded by the recommended flood management measures.

Just upstream of the Mill Road Bridge on Cazenovia Creek an ice retention structure consisting of a low gravity dam has been recommended<sup>1/</sup> to control ice related flooding which has been shown to be the primary flood problem on lower Cazenovia Creek. The dam would have a small stilling pool and would otherwise impound water only during floods. An ice boom would be placed across the stilling pool to form a stable ice cover in winter. Just upstream of the project Cazenovia Creek crosses the Portage escarpment in a picturesque gorge.

Plate 21 shows suggested recreational improvements upstream of the proposed ice retention structure. It consists of a nature trail through this partly forested area and along the creek. If an ice retention structure is authorized and approved, the possibility of developing a permanent recreation pool behind the dam could be considered in detail during the advanced engineering and design stages. Such an impoundment may have considerable potential and value as a warm water fishery.

Consideration was given to measures to improve the stream fishery upstream of the project. Log booms or check dams could be placed at intervals along the stream to create a series of riffles and pools. This measure was rejected because of low summer streamflow, and because the streambed is largely in bedrock and provides a fish habitat too low in quality to justify the investment in improvements.

Approximately three miles downstream of the project area is Cazenovia Park and golf course. A bicycle path is proposed, connecting Cazenovia Creek to the flood management project area, as shown on Plate 22. This bicycle path is similar to those described earlier in this chapter and constitutes an important link in a bicycle system connecting recreational and environmental focal areas throughout the Buffalo Metropolitan Area. Two views along the proposed Cazenovia Creek bicycle path are shown on Plate 30.

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<sup>1/</sup> Interim Report on the Feasibility of Flood Management in Cazenovia Creek Watershed, U. S. Army, Corps of Engineers, March 1975.

## Chapter IV

### STAGED DEVELOPMENT PLAN

#### 1. The First Phase of the Plan

Immediate and most pressing needs for recreational facilities, fishery access, control of debris, and streambank stabilization in the Buffalo Metropolitan Area can be met through implementation of the plan discussed in Chapter III by staged development as shown in Table 2. This combination of improvement, rehabilitation, and suggested administrative measures has a benefit-cost ratio of 4.7:1.0 based upon development costs<sup>1/</sup> of about \$1.3 million, equivalent average annual benefits of approximately \$2.5 million and equivalent average annual costs of approximately \$0.5 million.

The staged development plan differs from the development plan of Table 1 in that it represents a deferment of some features in favor of immediate improvement and rehabilitation of existing resources. The staged development plan would permit deferment of about \$3.8 million of development costs. However, implementation of measures proposed in the staged development plan does not preclude full development of each focal area at a later date. This procedure permits development of the waterfront recreation resources at a pace that might better correspond to local financial capability and the availability of funds and programs at the State and Federal levels, while at the same time meeting immediate needs.

The concept of staged development would be important to the waterfront ferry service proposal. This proposal represents an economically viable service that can be developed as a franchise or concession by the appropriate local authority. Implementation of the staged development plan would develop attractive recreation capacity on the waterfront attracting large numbers of people. : is a necessary condition if the ferry service is to be viable. Further development of the focal areas would then serve to insure the long-term success of the ferry service. The difference in annual benefits of \$1,208,000 and annual costs of \$512,800 between the Development Plan shown in Table 1 and the Staged Development Plan shown in Table 2 yields a benefit/cost ratio of 2.4:1.0 indicating that facility construction by staged development is incrementally justified.

#### 2. Elements of the Staged Development Plan

Certain measures and programs proposed as a part of the development

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<sup>1/</sup> The basis for determination of costs is described on Page III-1.

Table 2

## STAGED DEVELOPMENT PLAN\*

Location	Measure	\$	Total	Equivalent	Annual Benefits <sup>1/</sup>	Annual Benefit-Cost Ratio
			Development Costs	Costs <sub>1/</sub>		
Riverside Park, Buffalo to Isleview Park, Tonawanda	A Improvements to Existing Shoreline, Bicycle Path, and Pedestrian Overpass	313,000	114,000	887,000	7.8	
Squaw Island and Bird Island Pier	A Pier Rehabilitation, Squaw Island Parking	527,000	61,000	240,000	3.9	
Erie Basin Marina to LaSalle Park and Day's Point	A A Day's Point Parking, Bicycle Path	49,000	28,000	316,000	11.3	
NFTA Small Boat Harbor	A Dike Rehabilitation, Bicycle Path, Parking, Picnic Area	172,000	75,000	198,000	2.6	
Waterfront Ferry Service	B Two 25-Passenger Boats Nine Landing Docks	165,000	55,000	66,000	1.2	
Delaware Park Lake	B Two Extensions of Existing Bicycle Path System	37,000	34,000	382,000	11.2	
Control of Floating Drift and Streambank Debris	C Increased Cost to C of E for Maintenance of Black Rock Lock and Channel if Delaware Park Lane is Bypassed	12,000	12,000	106,500	1.0	
Cazenovia Creek	D Enforce Existing Laws & Improve if Necessary Periodic Streambank Maintenance Niagara Riverfront Maintenance Niagara Riverfront Surveillance	59,600	45,200	406,100	9.0	
TOTAL for the DEVELOPMENT PLAN	E Hiking and Nature Trail, Bicycle Path to Cazenovia Park	1,322,600	530,700	2,495,100	4.7	

\* See Chapter V, pages 1-4 inclusive, and plate 24 for cost-benefit data.

<sup>1/</sup> Approximately one-half of the equivalent annual costs are attributable to operation and maintenance of recreation facilities. If these facilities are operated on a regional basis, operation and maintenance costs likely would be less due to economy of scale.

plan are included in the staged development plan and are unchanged: The waterfront ferry service; Delaware Park improvements; control of floating drift and debris; Cazenovia Creek improvements; fisheries, and streambank stabilization program. These measures were described in detail in Chapter III.

The following sections describe staged development measures proposed for the Riverside Park, Bird Island Pier, Erie Basin Marina to Day's Point, and NFTA Small Boat Harbor areas. In appropriate instances intermediate steps between the staged development and full development measures are also described.

### 3. Riverside Park

Alternative A, includes the bike path along the Riverside Park shoreline extending north to the Isleview and Nia-Wanda Park area, and the pedestrian overpass. This measure relies on rehabilitation of the existing strip of shoreline which varies in width from 11 to 34 feet as shown on Plate 16. It includes hedge planting and an impermeable aluminum noise barrier approximately 12 feet high to screen the Thruway visually and acoustically.

Handrails would be installed along the existing concrete wall to protect bicyclists, fisherman and strollers, and water safety equipment would be located at suitable intervals.

### Alternative B

Plate 16 also shows intermediate development of this area as alternative B. This alternative would create approximately six acres of new park land by constructing a land fill with a bulkhead constructed in the same manner as alternative C. The landfill would extend the shoreline riverward a distance equivalent to the width of the existing strip of land. The new park land would accommodate vehicular access and parking, a surfaced bicycle path, and a walkway. Picnicking facilities could be included in the development.

There exist a great many choices of development between alternative A and C, and alternative B is meant to be a representative choice. The environmental and technical limits of resource expansion at Riverside Park, must be carefully considered to determine the best alternative plan for development. The IJC, United States Fish and Wildlife Service, and the New York State Department of Environmental Conservation, must review and approve alternative B or C plans before either could be constructed.

#### 4. Bird Island Pier and Squaw Island

The early action measure consists of pier rehabilitation for improved access, and parking on Squaw Island, as shown on Plate 17. The development of new park land across from LaSalle Park and the bicycle path on Squaw Island would be deferred for later development. A bus stop presently exists at West Ferry Street, and with the addition of some parking on Squaw Island, the rehabilitation of the pier would develop fishing benefits. In addition, Federal interests could participate in the implementation of this early-action measure, and the U.S. Fish and Wildlife service has indicated that it merits immediate attention because of its proximity to public transportation and the central urban area.

#### 5. Erie Basin Marina - LaSalle Park - Day's Point

The initial development for this focal area (Sheets 5 and 6 of Plate 15) is identical to the full development plan except that the rehabilitation of the existing wall separating LaSalle Park and the Black Rock Channel would be deferred. The remaining improvements, a bicycle path connecting the areas, expanded parking at Day's Point, ferry landings, and the provisions of water safety equipment constitute basic development of the focal area.

#### 6. NFTA Small Boat Harbor

The NFTA Small Boat Harbor presents a unique opportunity for staged development (Plate 20). The initial development, A, includes: rehabilitation of the existing dike for improved protection of the harbor area and safer fishing access; expanded parking; a bicycle path connecting with the City of Buffalo's proposed bicycle path and the Tifft Farm Nature Preserve; a comfort station with water and sewage; and the development of the experimental dredge disposal site, which should be available by 1977, into a park area with picnicking facilities and fishing access to the Buffalo Outer Harbor. The Small Boat Harbor area would have approximately 2,500 feet of safe and pleasing fishing access along the rehabilitated dike and the dredge disposal dike.

The second phase of development includes additional boat mooring slips, and the creation of approximately six acres of new park land inside the Small Boat Harbor utilizing diked dredging spoil. With this development, the Small Boat Harbor area would have approximately 26 acres of park land, and extensive basic recreation facilities.

## Chapter V

### ECONOMIC EVALUATION AND ENVIRONMENTAL ASSESSMENT

Broad evaluation of proposed plans is an important and essential step in planning for the management of water and related land resources. Such an evaluation should include expressions of national, regional and local goals, values, and priorities. This chapter presents a general discussion of the evaluation criteria used in the present study, the methodology used and the result of the economic evaluation, and the environmental assessment of measures.

#### 1. Summary of the Evaluation Criteria

The overall purpose of water and related land resource planning is to promote the quality of life as indicated by two objectives: to enhance national economic development by increasing the value of the nation's output of goods and services and improving national economic efficiency; and, to enhance environmental quality by management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

The secondary objectives are to enhance regional development as indicated by regional income, employment, population base, environment, and social development, and to enhance social well-being as indicated by equitable distribution of real income, security and quality of life, health, safety, educational, cultural, and recreational opportunities, and emergency preparedness.

To achieve the national economic development objective, the equivalent average annual benefits of a plan should equal or exceed the equivalent annual average cost of the plan. Some benefit categories, such as certain aspects of environmental quality or enhancement of social well-being, cannot always be evaluated in tangible terms. Such intangible benefits must, therefore, be considered in descriptive terms.

In this study, economic evaluation is based upon existing and generalized construction costs and benefits, and upon conceptual layouts of considered measures. Measures were evaluated with respect to the objective of enhancing environmental quality by making an environmental assessment based upon existing environmental reports related to the study area and upon a brief field reconnaissance. In developing the measures, emphasis was placed upon enhancement of the general environmental and aesthetic quality of the urban environment.

Two additional criteria were consistently applied: compatibility with existing and proposed Federal projects, and compatibility with and enhancement of existing and proposed regional and local plans and programs. Improvement measures discussed in this report for existing and proposed Federal projects were carefully considered to ensure compatibility and still achieve the objectives of the present study.

## 2. Economic Evaluation of Measures

Plate 24 shows a table summarizing an economic evaluation of the measures described in Chapters III and IV. All measures for which benefits are quantifiable show a benefit-cost ratio greater than 1, ranging from 1.2 to 11.3. With respect to each focal area, incremental benefit-cost ratios between stages of development all exceed a value of one.

A design concept and costs were developed for each element of a measure, such as bike paths and picnic areas. Unit costs were derived from two primary sources; "Building Construction Cost Data", 1974, R. S. Means Company, and cost data for similar recreational developments.

Annual average costs and benefits are determined on the basis of a 50-year amortization period using an interest rate of 5.875 percent. The replacement time interval for facilities with an economic life shorter than 50 years was assumed to be 25 years. Annual operation and maintenance cost are estimated based on a variable unit cost per user-day largely derived from Federal Power Commission cost data. The Federal Power Commission has developed cost data for most areas of the United States, including New York State. Even though the cost data are not project specific, they are average values and are considered adequate for use in this feasibility study. In the case of control of debris: annual enforcement costs were estimated based upon 1-1/2 man-years per year and include an overhead multiplier of 2.0, a Streambank maintenance costs are based upon 40 crew days per year, and Niagara River-front maintenance costs are based upon 20 crew days per year.

Total daily capacity of facilities is based primarily upon length of shoreline development, optimum number of users per unit length, and turnover rate, except for certain facilities such as parking and bicycle paths. Data on optimum number of users per unit shoreline length and turnover rates are derived from data and planning standards of the U.S. Department of the Interior, Bureau of Outdoor Recreation, and data developed for the New York Statewide Comprehensive Outdoor Recreation Plan.

The procedure used to determine the total daily capacity (user-days) consists of multiplying the instant capacity by a turnover factor. For

bike paths, the instant capacity is the quotient of the total path length in feet divided by an assumed distance of 65 feet between bicycles. The bike paths would be bi-directional and therefore the lengths are doubled in determining capacities. The turnover factor is based upon total daily hours of bike path use (assumed to be 10 hours), path length and bicycle speed (assumed to be six mph). A turnover of 8.6 resulted but a factor of seven was used to be conservative. The turnover factor for hiking of 1.5 assumes four persons in a party and five parties per mile. A turnover factor of two was used for pier and bank fishing that assumes a spacing of 20 feet between fishermen and fishing from both sides of Bird Island Pier. A turnover of 1.2 was used for picnicking that assumes eight tables per acre and four persons per table. All computations used to develop daily capacities reflects some inclement weather.

Projections of use, from which annual benefits are derived, are based upon the following assumptions: the summer season consists of 22 weeks (May through September); the winter season consists of the remaining 30 weeks; capacity use occurs on two weekend days each week, thus capacity use occurs on 44 days per year; total weekday use (five days) equals 100 percent of one weekend day use (or one weekday use equals 20 percent of one weekend day use); winterday use averages 10 percent of weekday capacity. Total annual user days with facilities at full capacity use are thus equal to the sum of the following three totals:

- |  |   |                |
|--|---|----------------|
| 1. (44 peak weekend days) (100 percent capacity)     | = | 44 days        |
| 2. (22 weeks) (5 days/week) (20 percent of capacity) | = | 22 days        |
| 3. (210 winter days) (10 percent of capacity)        | = | <u>21 days</u> |
| Total annual equivalent days of capacity use         | = | 87 days        |

These use projections are conservative since the facilities would be in a densely populated, urbanized area, and used by shift workers, retirees, and others who normally have free time during the day. Turnover would be rapid and facilities would be used from early morning to late evening. This intensive use was observed at the limited facilities near Riverside Park.

The total annual visitation in user-days was estimated for each measure as shown in Plate 24. These values were checked for reasonableness by comparing them with the forecast of outdoor recreation demand

given in the New York Statewide Comprehensive Outdoor Recreation Plan.<sup>1/</sup>

The results of the State's plan were reviewed and concurred in by the U. S. Bureau of Outdoor Recreation.

Monetary benefits in terms of average annual benefits were assigned by using a benefit value of \$1.50 per user-day. This value is mid-range of the values suggested by the Water Resources Council.

Benefits were assumed to rise from zero to full annual value in a uniform linear manner over five years, and thereafter were assumed constant and equal to the annual average value derived from visitation and benefit per user-day.

### 3. Summary of the Environmental Assessment

The proposed measures deal with the rehabilitation, improvement, and enhancement of Buffalo metropolitan (and to a limited extent regional) area resources. Associated with these measures are potential social, environmental, and economic impacts, some of which are beneficial, while others are adverse. An assessment of these impacts has been made and the result is summarized below.

Implementation of the development measures can contribute significantly to the social well being and environmental appreciation and enjoyment of the expanding urban population of Buffalo. The measures concentrate upon the Niagara River which is a largely undeveloped natural resource that lies adjacent to a large urban population. This recreation, fishery, and environmental resource can be reached by public transportation, and through the proposed improvements these resources would be made more accessible by providing additional access points to safe facilities situated in enjoyable surroundings. Bicycle paths, picnic areas, and new or improved fishing access areas would promote greater public use of the river and its resources.

To a somewhat lesser extent, the resources of Lake Erie would be made more accessible to the people of the Metropolitan area and the region.

Aesthetic values would be enhanced by some of the proposed measures. The rehabilitation of Bird Island Pier and the dikes at the Small Boat

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<sup>1/</sup> New York State Office of Parks and Recreation, 1973

Harbor would improve the aesthetics of these structures in addition to making them safer and more useable. The creation of additional park land along the waterfront would present aesthetically pleasing areas for public use and enjoyment. Certainly, the control of floating drift and streambank debris would enhance the aesthetic quality of the streams in the region and especially the urban streams.

Improved access to and along the waterfront would encourage greater public utilization and enjoyment of the Niagara River. The ferry service would greatly expand aesthetic and recreational opportunities.

Landfill operations and construction activities associated with some of the proposed measures would have a temporary and localized impact on regional aesthetics. Permanent structures, such as the pedestrian overpass at Riverside Park, and the improvement of the Bird Island Pier would have some visual impact, but could be turned into an aesthetic asset if careful attention is given such criteria during design.

Noise and minor dust production would occur during construction of some of the considered measures. These impacts would be temporary and of only minor importance.

Public facilities for picnicking, walking, bicycling, sightseeing, boating, and fishing would be provided by the proposed measures. These facilities would not only meet some of the demonstrated needs of the region, but would also promote greater utilization of available resources.

The measures could result in the need to increase public services slightly such as routine police patrols and park department maintenance crews. Clearing and clean-up of streambank debris could result in the need for additional work crews. Whether these increases are viewed as additional employment opportunities or a burden on present public services depends upon the magnitude of the additional work force needed and the means of financing operation and maintenance activities. The program described in Chapter III is designed in part to minimize this potential burden.

The natural resources of the area, especially the sport fishery resources, are improving. The proposed measures would promote fuller utilization and enjoyment of the natural resources of the Metropolitan area. Many of the measures would enable greater utilization by the inner-urban population by means of public transportation or by bicycling or by walking.

Landfill operations would result in the loss of relatively small areas of aquatic habitat, possibly of fish spawning sites and could affect river and channel flow. These possibilities must be investigated in detail prior to providing any landfill.

Some water pollution would be caused by landfill operations. Depending upon the source of the fill material, the impact would be temporary. Control of riverfront and stream debris, and floating drift, and the cleanup of Delaware Park Lake would result in improvement to water quality.

Implementation of the proposed measures would result in a commitment of both financial and construction material resources. The material resources primarily consist of rock, fill material (dredge spoil), and small quantities of other construction materials (asphalt, metals, wood, etc.). All of these are readily available locally and their use in this project will not affect the short or long term availability of such resources. The required financial resources, as shown in Tables 1 and 2, and on Plate 24, are not large and will be provided by several levels of government.

No people or farms would be displaced by any of the proposed measures. Similarly, it is unlikely that tax revenues or business and industrial activities would be affected by the proposed measures. Property values along urban streams that are cleaned up could increase although the effect of this secondary impact may be slight.

Beneficial impacts of a secondary nature could occur as they relate to community cohesion, desirable community growth and desirable regional growth. Access to and enjoyment of recreational opportunities along the waterfront has the potential for affecting urban community cohesion. Enhancement of water related environmental quality along the Niagara River and the regional streams could affect community and regional growth patterns. As water quality improves and stream classifications change there will be increasing pressure to prohibit adverse developments along stream courses. This will affect the patterns of future growth in the Buffalo Metropolitan Area.

#### 4. Environmental Assessment of Measures

Not only are there impacts associated with each of the proposed measures but there are also broader social and environmental impacts associated with groups or combinations of the measures. On a regional scale, implementation of the measures described in Chapter III will provide an integrated plan of recreation, fishery and overall environmental quality improvements of a realistic nature. Use and enjoyment

of regional resources will be made more available to the urban as well as to the regional population. Access to Lake Erie and to the Niagara River is an important aspect of the proposed development measures. Interconnections of the waterfront by bikeways, planned to mesh with the City of Buffalo urban bike routes, and the provision of waterfront access to sites of improved facilities accessible by city buses would place safe and enjoyable aesthetic and recreational opportunities within easy reach of the urban population. The waterfront ferry service would provide additional urban and regional recreational experience. Social well-being would be enhanced by these measures.

An area-wide program to control floating drift and streambank debris coupled with streambank erosion control would result in generally improved environmental quality. Implementation of a regional plan of developing open space corridors would also contribute to improved environmental quality. One of the results of these measures (aided greatly by the implementation of wastewater plans) would be the upgrading of water quality to a level sufficient to permit the rehabilitation of urban streams. These streams have excellent recreational and fishery potential.

An assessment of the environmental consequences of each of the measures and alternatives considered follows:

#### Riverside Park

A bicycle path and a pedestrian overpass over the New York State Thruway are common to the three alternative developments considered for Riverside Park. Availability of access to the waterfront at this location, especially to pedestrians and those using bicycles, would meet a recognized need for residents of the area. Safe access across the Thruway would be a major improvement over the present situation.

Some temporary localized disruption of traffic patterns and minor visual impact would occur as the facilities (especially the overpass) are being constructed. The visual impact of the completed overpass would be minor since similar structures are common to expressways in the Buffalo area.

#### Measure A

Selective hedge plantings of shrubs and grass and the noise barrier considered in this alternative would greatly improve the aesthetics of the riverfront area and make the use of the location more enjoyable. There could be some objection to the blockage of the river view from

the Thruway. However, the view from Riverside Park, for the most part, would not be obstructed because of the elevation difference between the park and the riverfront. Hand railings and other safety equipment at the site would add to the safe use of the area by fishermen and bicyclists.

#### Measure B

The creation of additional riverfront land with pedestrian access facilitated by the overpass would provide for increased recreational opportunities in the form of shoreline fishing, bicycling, walking, and picnicking. This is an important positive improvement for the surrounding urban area that is presently virtually shut-off from access to the riverfront.

Construction of park land on the riverfront by landfill would have a negative impact on local water quality and aquatic organisms. The degree, duration, and importance of the impact on water quality would depend upon the type of fill material used and the procedure followed. In any event, temporary turbidity would occur in the area and possibly be transmitted downstream. Benthic organisms would be buried by the landfill and littoral aquatic habitat would be lost. However, the area to be filled under this measure would be relatively small. Staff of the N.Y.S. Department of Environmental Conservation (Olean) and the U.S. Fish and Wildlife Service (Cortland) have indicated that this area may be a fish spawning ground because of its general characteristics. However, this has not yet been established by detailed aquatic study. A more detailed environmental assessment should include a survey of the aquatic life present in the area to be filled and a determination as to whether the location serves as a spawning ground for walleye or other important fishes to evaluate the importance of the possible impact. Additionally, before Alternative B is constructed, details of the proposed measure must be submitted to the IJC for an engineering determination of the effect on the river regime and for its approval. A Section 10 and 404 Corps of Engineers permit would also be required.

#### Measure C

This alternative for development in the Riverside Park area involves the creation of approximately 22 acres of riverfront parkland and is an extension of Measure B. As a consequence, the environmental impacts would be of a similar type, only greater in magnitude. The new park land could support more visitors in a less crowded situation and as a result would provide greater recreational opportunities. On the other hand, more aquatic habitat would be lost and the potential disruptive effects of the landfill operation would be greater. The larger land fill has the slight potential of altering the hydraulic regime of the

Niagara River, but this effect is thought to be negligible because of the very low conveyance evidenced by slack water in this area. Before Alternative C is constructed, details of the proposed measure must be submitted to the IJC for an engineering determination of the effect on the river regime and for its approval. A Section 10 and 404 Corps of Engineers permit would also be required.

#### Bird Island Pier

##### Pier Improvements

Pier improvements to facilitate safe access are considered for Bird Island Pier. The pier at present is not safe for recreational use, especially during the winter or at times of high water. Fishermen and sightseers use the pier, even though such activities are discouraged by the Corps of Engineers because of the safety hazard.

Structural modifications to the pier as shown on Plate 17 would provide attractive and safe facilities for pier fishing and hiking. The recreational opportunities thus afforded would be valuable improvement over the present situation since both the fishery resource and the visual properties are already present.

Rehabilitation of the pier could result in temporary water quality disturbance, and the new structure would have a visual impact of its own. The safe useability of the new facility by fishermen and others would more than offset these impacts.

#### Landfill

The seven-acre park created by a landfill, (as shown on Plate 17 opposite Porter Avenue) would provide additional recreational opportunities at Bird Island Pier in the form of bank fishing, picnicking, hiking, and sightseeing. The present boat anchorage site in the area would not be affected by the landfill since the fill would be placed in a rock bottom area that is too shallow for mooring boats.

The landfill would result in temporary turbidity during construction and permanent loss of aquatic habitat. Benthic organisms would be lost and the littoral zone would be removed from use and production of aquatic life. A survey of the types of aquatic organisms located in the area should be conducted prior to plan implementation to determine the specific ecological impact. Staff of the N.Y.S. Department of Environmental Conservation (Olean) and the U.S. Fish and Wildlife Service (Cortland) have indicated that this area may be a spawning ground because of its general characteristics. However, a detailed aquatic study has not been accomplished.

#### Erie Basin Marina-LaSalle Park-Day's Point

At present this section of the waterfront ranges from slightly developed to highly developed. Erie Basin Marina provides boat launching and mooring facilities in addition to a parking lot, a restaurant, and an observation tower. The marina experiences turbulence during certain wind conditions that discourages some boaters from mooring their boat at the facility. LaSalle Park provides a waterfront picnic area and parking lot. People fish from the park although obstacles such as shoreline erosion and a deteriorated fence detract from its aesthetics and use. A small, undeveloped parking lot is present at Day's Point which provides access to the Black Rock Canal for fishermen.

#### Bicycle Path and Parking

This measure would facilitate access to the area by the construction of bicycle paths and an expansion and improvement of the parking lot at Day's Point. Environmental impacts associated with installation of this measure would be minimal. Aesthetics would be improved by the removal of the deteriorated fencing at LaSalle Park.

#### LaSalle Park Shore Protection

The addition of a shore protection structure at LaSalle Park would improve access for fishermen and would serve to abate shoreline erosion. Slight losses of the aquatic littoral zone would occur. This impact plus possibly a study of the wave mechanics associated with the proposed structure as it relates to nearby areas, particularly the Erie Basin Marina. should be investigated in following studies. The city of Buffalo is conducting a study of protecting the wall along LaSalle Park.

#### NFTA Small Boat Harbor

The NFTA Small Boat Harbor is used extensively during the boating season and serves as an important bank and ice fishing facility. The dikes at the harbor are in disrepair and most of the dike is unsafe for recreational use. There is a real need to rehabilitate this important facility, as well as to expand recreational opportunities.

#### Dike Rehabilitation

Safe utilization of the NFTA dike by fishermen and the protection of an important recreational resource (and financial investment), are major positive impacts.

Dike rehabilitation would result in slight temporary turbidity and disruption of aquatic organisms. The magnitude of these impacts is minor.

#### Landfill

Park development at NFTA by a landfill would create new recreational opportunities which would benefit area residents. Loss of aquatic habitat and temporary degradation of water quality would occur.

#### Expanded Facilities

Creation of a 28-acre landfill outside the existing NFTA Small Boat Harbor would result in the loss of aquatic habitat, loss of benthic organisms, and in temporary turbidity during construction. The new park land created, with its associated facilities (additional boat slips, picnic facilities and comfort station), would provide new and/or additional recreational opportunities and result in increased access to Lake Erie for the regional population.

#### Waterfront Ferry Service

A regional recreational resource would be added by the provision of a waterfront ferry service. In addition to providing a unique recreational resource in itself, the ferry service would: augment access to various riverfront sites beyond those that would be provided in other measures, provide fishing access to Strawberry Island to people that do not have use of boats; and, provide an additional and enjoyable means of access, other than by car or bus, to Beaver Island State Park and its recreational facilities.

#### Delaware Park Lake

Construction of bicycle paths in Delaware Park would have no adverse environmental impact. The construction of a stream bypass system planned by the City of Buffalo is intended to improve the water quality of Delaware Park Lake. This construction and the clean-up operations at Delaware Park Lake would result in temporary disturbance to water quality and the surrounding landscape. Personnel from the Department of Environmental Conservation have indicated their willingness to stock warm water fish in the lake after it is cleaned. This would provide an additional recreational opportunity to area residents.

#### Cazenovia Creek

The addition of hiking trails within the project area of the recommended ice retention structure on Cazenovia Creek,<sup>1/</sup> and the linking of the project area with Cazenovia Park by a bicycle path would provide additional recreational opportunities to area residents and would permit the implementation of the recreation corridor concept along Cazenovia Creek. There are no adverse environmental impacts associated with these proposals.

#### Control of Floating Drift and Streambank Debris

Periodic removal of floating drift and streambank debris from area streams and the Niagara riverfront would greatly improve the water related environmental quality of the study area. Offensive sights and odors would be reduced or eliminated, and as a result, the aesthetics at points of access to regional streams or open stream corridors would be enhanced. This measure would also result in improved water quality, eliminate some hazards to navigation, enhance fish and wildlife habitat, reduce fire hazards to waterfront structures and would provide some flood protection benefits.

#### 5. Conclusions

The environmental and economic assessment of the elements of the development and stage development plans shows that these plans are economically and environmentally feasible. Adverse environmental impacts may be minimized by proper choice of design criteria and supervision of construction. In general the measures considered have large and significant positive environmental and social impacts. The proposed plans and the measures that constitute them have favorable benefit-cost ratios.

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<sup>1/</sup> Interim Report on the Feasibility of Flood Management in Cazenovia Creek Watershed, U. S. Army, Corps of Engineers, March 1975.

## CHAPTER VI

### INSTITUTIONAL ANALYSIS AND PLAN IMPLEMENTATION

#### 1. General

The overall objective of this institutional analysis is to determine the capabilities of existing water resource management interests in the study area to implement the improvement plans developed in this Feasibility Study. This analysis involved a series of tasks that began with providing various agencies and groups an opportunity to assist in plan development by conducting informal workshops and discussions. Following development of the plan, these interests were invited to a meeting to discuss the measures that affect their interests and to provide them with data for review to determine the extent of their participation in plan implementation. The next task was to relate their capabilities and desires for the development plan and present the findings to the general public for comment. The comments of the public were then carefully considered and reflected in the study recommendations.

#### 2. Affected interests

The affected and/or involved interests in the study area are political subdivisions, agencies, private property owners and facility users. Each of these interests are reasonably easy to identify. Affected political subdivisions include: New York State; Erie County; towns of Cheektowaga, Grand Island, Tonawanda, West Seneca; city of Buffalo; and, city of Tonawanda. Some of these subdivisions such as the towns of Cheektowaga and Grand Island will not be affected as much as the others since the proposed facilities would not be constructed within their corporate limits.

The agencies that would be involved in implementation of these improvements include: The U.S. Army Corps of Engineers; the U.S. Bureau of Outdoor Recreations; the U.S. Soil Conservation Service; New York State Office of Parks and Recreation; N.Y.S. Department of Environmental Conservation; N.Y.S. Department of Transportation; N.Y.S. Thruway Authority; Buffalo Sewer Authority; Niagara Frontier Transportation Authority; Erie County Department of Environmental Quality; City of Buffalo Departments of Public Works, Transportation, Planning and Programming, and Parks and Recreation; and the Parks and Recreation Departments of the towns of Tonawanda, West Seneca and the city of Tonawanda.

General Motors Corporation and Dunlop Tire and Rubber Company would also be directly affected since portions of the proposed bike

path interconnecting Riverside Park with Sheridan Park would be located on their properties. Small portions of the bikeways would impact on private properties along some streets and highways. The effect on users is difficult to assess other than to recognize that they would be beneficiaries and be required to support the financing of the improvements through tax payments or user fees.

Several Federal agencies would be involved in implementation of the improvements, either by cost sharing or legislative control. The Federal agencies that would be involved include: The Corps of Engineers; U.S. Bureau of Outdoor Recreation; U.S.D.A. Soil Conservation Service, U.S. Fish and Wildlife Service; and, the U.S. Environmental Protection Agency. In addition, the International Joint Commission would be involved in matters which would impact on flows and levels of the Niagara River.

### 3. Federal Participation in Implementation of Development Plan

The Corps of Engineers could participate in the following portions of the Development Plan:

a. Modification of the Bird Island Pier for public safety (100% Federal funding);

b. Dredging of Black Rock Canal to remove additional sediment deposition from Scajaquada Creek if the Creek is by-passed around Delaware Park Lake (100% Federal funding);

c. Development of recreational facilities along Cazenovia Creek if the flood control improvements recommended in the Cazenovia Interim Report are authorized (50% Federal funding).

The U.S. Bureau of Outdoor Recreation (BOR) could participate in all of the other elements of the Development Plan except the Waterfront Ferry Service, if the non-Federal agencies apply for assistance through the New York State Office of Parks and Recreation and if the State and BOR approve the request and funds are available. The amount and extent of BOR cost-sharing is based upon the Land and Water Conservation Fund Act of 1965 and subsequent related Public Laws and Amendments. The objective of this legislation is to provide financial assistance to the States and their political subdivisions for the preparation of statewide comprehensive outdoor recreation plans and acquisition and development of outdoor recreation areas and facilities for the general public. In New York State, the Office of Parks and Recreation (OPR) has been designated the administrator of the State's Land and Water Conservation Fund Program. Only OPR can apply to BOR and be eligible for project grants or make application on behalf of other State agencies or political subdivisions, such as cities, counties, and towns.

There are a wide range of outdoor recreation facilities for which grants can be used such as picnic areas, inner city parks, bike trails and support facilities such as roads and water supply. The facilities must be open to the general public and not limited to special groups. Development of basic rather than elaborate facilities is favored. Priority consideration is generally given to projects serving urban populations. Federal funds from BOR amounting to 50 percent of the facilities' first costs are available but operation and maintenance of the facilities are totally a non-Federal responsibility.

#### 4. Views of Interests

The development plan was discussed with the Niagara Frontier State Park and Recreation Commission (NFSP&RC), regional administrator for OPR, to determine if the Development Plan would be compatible with the Statewide Comprehensive Outdoor Recreation Plan (SCORP). Staff of NFSP&RC favored the plan since it would be compatible with SCORP and suggested that the plan should be discussed with BOR prior to meeting with local governments to determine if the various plan elements would qualify for Federal funds under the Land and Water Conservation Fund Act of 1965. The plan was discussed with staff of the Northeast Regional Office of BOR in Philadelphia, PA on 23 September 1975. BOR staff favored the plan and stated that all of the plan elements have potential to qualify for Land and Water Conservation Funds except the proposed ferry service and Corps maintenance work.

A meeting was held with local governments in Buffalo District Office on 26 September 1975 to discuss cost sharing and plan implementation and obtain their views on the Development Plan. All known interests who would have responsibilities in implementing the plan here were invited. The meeting was attended by State, County, Town, City, and private interests. A list of those attending is provided in Table 3. The Development Plan was discussed and no one expressed disinterest. Interests at the meeting were told of the possibility of obtaining a grant from BOR and that the NFSP&RC could assist them in making application. Furthermore they were told that all applications for Land and Water Conservation Funds from BOR must be made through New York State OPR who has designated NFSP&RC as their regional administrator. Those present were assured that the Development Plan can be modified if necessary to be compatible with their local plans for recreation.

Each representative was furnished minutes of the meeting and requested to furnish their views on the plan by 20 October 1975. Appendix A includes responses from these agencies.

TABLE 3

Attendees at 26 September 1975 Meeting in Buffalo District  
to Discuss Development Plan

Mr. John P. Reville, Jr. Councilman, North District City Hall Buffalo, NY 14202	Mr. John Seager Assistant Regional Park Manager Niagara Frontier State Park and Recreation Commission Prospect Park Niagara Falls, NY 14303
Mr. Terry Martin Program Planning Room 920, City Hall Buffalo, NY 14202	Mr. Edward P. Lesswing NYS DOT General Donovan Office Building 125 Main st. Buffalo, NY 14202
Thomas J. Reardon, Harbormaster City Hall Buffalo, NY 14202	Mr. Charles Brown Director, Division of Planning Erie County Office Building 95 Franklin Street Buffalo, NY 14202
Mr. Wilfred Goddard, Jr. Municipal Building 2919 Delaware Avenue Kenmore, NY 14217	Mr. Charles Frisa Fish and Wildlife NYS Dept. of Environmental Cons. 128 South St. Olean, NY 14760
Mr. Chester Bryan Town of Cheektowaga Engineer Town Hall Broadway & Union Road Cheektowaga, NY 14225	Mr. Spencer P. Schofield Erie & Niagara Counties Regional Planning Board 2085 Baseline Road Grand Island, NY 14072
Mr. Wallace Ochterski Town of West Seneca Engineer 1250 Union Road West Seneca, NY 14224	
Mrs. Irene K. Gardner 44 Royal Avenue Buffalo, NY 14207	

Corps of Engineers Representatives

COLONEL BERNARD C. HUGHES, District Engineer

Mr. Donald Liddell

Mr. Charles Gilbert

Mr. Daniel Kelly

Mr. Joseph Hassey

Representatives from the city of Tonawanda and the town of Tonawanda did not attend the meeting but were contacted soon afterward and advised of matters discussed. City and town of Tonawanda officials expressed interests in the Development Plan and favored the concept. The city of Tonawanda has plans for a bike path to interconnect Nia-Wanda Park with Sheridan Park. Even though the alignment of the path may not be identical to that developed in this study, the path would serve the same purpose of interconnecting existing recreation facilities.

General Motors Corporation and Dunlop Tire and Rubber Company officials were contacted individually to discuss the Development Plan and to obtain their views. Both companies expressed a willingness to cooperate in furnishing land easements for the bike path that would interconnect Riverside Park with Sheridan Park.

A public meeting was held on 5 November 1975 to obtain the views of the general public on the Development Plan and to tell them of the views of local governments and possible methods of plan implementation and cost sharing. The public favored the plan and their expressions are contained in the record of the public meeting.

## Chapter VII

### CONCLUSIONS AND RECOMMENDATIONS

#### Discussion

The Buffalo Metropolitan Area has a valuable and abundant water resource, particularly along the Niagara River, much of which is undeveloped or inaccessible for public use and enjoyment. During this feasibility study, Federal, State, county, city and private individuals were consulted and it was determined that the people in the study area desire improvement of water and related land resources for public use. People now bicycle, fish, hike, picnic, sightsee, rest, and boat in the Buffalo Metropolitan Area under unsafe, adverse conditions because of limited facilities, limited access, poor water quality and an inadequate environmental quality setting.

The development plan shown in Table 1 or the staged development plan shown in Table 2 would, if implemented, provide increased opportunities for expanded, safe, convenient, and enjoyable public use of water and related land resources in the Buffalo Metropolitan Area. Other improvements to enhance fish and wildlife resources, expand urban fishing opportunities, and to stabilize streambanks are also necessary for full utilization, preservation and enhancement of water resources in the Metro Area. Both plans are acceptable to local governments and the general public. The Study has been made in compliance with Principles and Standards developed by the President's Water Resources Council and represents adherence to the National Policy for considering alternative plans for water-related land resources and for evaluating the effects of such plans.

All measures developed in this Study would make efficient and worthwhile use of waterfront lands that should properly be for public use and enjoyment. The staged development plan permits construction in increments that would not preclude full development when additional funds become available. The initial development would cause little change in the environment or commitment of resources. Proposed vegetative plantings and improvement of water quality through control of floating drift and streambank debris are plan elements that would improve the natural environment.

Both the development plan and the staged development plan provide the basis for assessing the extent of Federal interest and funding to support each plan. The planning objectives cited in the foreword to this report were carefully considered during the Study and the proposed

plans would satisfy these objectives. The plans can be implemented without additional legislation except for appropriation of Federal and local funds. The Corps can rehabilitate Bird Island pier and maintain Black Rock channel to project depth without further legislative actions. These Corps activities would be accomplished under the operations and maintenance program for the Black Rock channel and Tonawanda Harbor, NY, project. However, Corps maintenance funds cannot be used for providing a bicycle path and parking area on Squaw Island or for park development by land fill on the Black Rock Canal side of Bird Island pier opposite LaSalle Park. The U. S. Bureau of Outdoor Recreation could participate in development of the bicycle path and parking on Squaw Island and the Corps could participate in development of the proposed park development alongside Bird Island pier under the Code 710 Program for Recreation Development of Completed Projects.

The Final Environmental Statement for operation and maintenance of the Black Rock channel and Tonawanda Harbor, NY, project was filed with the President's Council on Environmental Quality in 1975. Completion of Bird Island pier rehabilitation work will be accomplished as necessary operations and maintenance funds become available. The Corps cannot cost-share in recreation facilities along Cazenovia Creek until the recommended Ice Retention structure becomes an authorized project and local interest and cost sharing is assured.

All elements of the development plan or staged development plan, except for the Corps work discussed above, would be the responsibility of non-Corps agencies. BOR has funds for cost sharing in facility costs or any additional planning that may be required. Further, BOR could cost-share in the proposed recreation facilities along Cazenovia Creek without an authorized Corps project since the facilities inter-connect existing public parks.

#### Conclusions.

It is concluded that:

- a. The development plan shown in Table 1 and the staged development plan shown in Table 2 are feasible from an economic and an engineering standpoint;
- b. The impact on fishery resources, the erosion effects on Strawberry Island, and the International aspects of any flow pattern changes must be carefully considered in development of any plan for filling in the Niagara River;
- c. The existence of drift and debris in and along the waterways and streams in the Buffalo Metropolitan Area continues and removal and

disposal measures are necessary;

d. The erosion of streambanks in the Buffalo Metropolitan Area is continuing and stabilization measures are necessary; and

e. The fish and wildlife resources of the Buffalo Metropolitan Area have not been fully assessed. Additional information is necessary for proper and full development of fish and wildlife management programs and plans.

Recommendations

I recommend that:

a. The Development Plan be implemented, by staged construction if necessary, in accordance with applicable laws, regulations, and constraints;

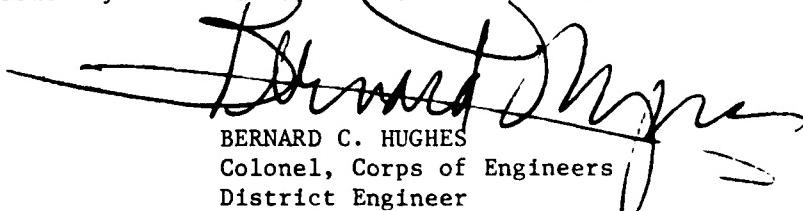
b. The U. S. Army Corps of Engineers rehabilitate the Bird Island Pier in the interest of public safety under the operations and maintenance program for the Black Rock channel and Tonawanda Harbor, NY;

c. The U. S. Bureau of Outdoor Recreation consider participation with non-Federal interests in all aspects of the Development Plan except Corps project maintenance and the Waterfront Ferry Service;

d. Stream bank stabilization be accomplished wherever possible at non-Federal expense except for costs incurred by the U. S. Soil Conservation Service in providing technical assistance within areas of their responsibility; and

e. A Fish and Wildlife Management program and plan be developed by non-Corps interests.

f. The Buffalo District continue to participate on the Technical Advisory Committee of the Erie-Niagara Counties Regional Planning Board (ENCRPB) in conjunction with the areawide waste treatment management study effort being accomplished by ENCRPB under Section 208 of Public Law 92-500.

  
BERNARD C. HUGHES  
Colonel, Corps of Engineers  
District Engineer

FINAL FEASIBILITY REPORT  
BUFFALO METROPOLITAN AREA, NY  
COMPREHENSIVE WATER AND RELATED LAND RESOURCE MANAGEMENT

INTERIM REPORT  
ON  
STREAMBANK PROTECTION, WATER-RELATED RECREATION  
FISH AND WILDLIFE MANAGEMENT, AND WATER-RELATED  
ENVIRONMENTAL QUALITY MANAGEMENT

APPENDIX A

CORRESPONDENCE

U. S. ARMY, BUFFALO DISTRICT, CORPS OF ENGINEERS  
1776 NIAGARA STREET, BUFFALO, NY  
NOVEMBER 1975

BUFFALO EVENING NEWS - 6 Nov 75

## Citizens Urged to Push Shore Plan

By CEASER WILLIAMS

Citizen concern may decide the future of a proposed \$4.8 million shoreline improvement project, according to Col. Bernard C. Hughes, chief of the Buffalo District of the U. S. Army Corps of Engineers.

"I urge you to get after those elected officials to see that something is done with this proposal," Col. Hughes said Wednesday at a public hearing in the Buffalo Museum of Science.

"We need interested people to get to the people who control the money in Buffalo and Erie County," the colonel said.

The project, drawn by the Corps, would open up public access to the harbor and Niagara River shoreline for fishing, biking, boating, picnicking and a new ferry service.

\* \* \*

**COL. HUGHES** said Buffalo and Erie County, the local government bodies that would probably take the lead in the

development, could apply to the federal Bureau of Outdoor Recreation for about half the funds.

An outdoor recreation planner with the Bureau told about 40 persons the project is a "commendable plan."

Bernard C. Fagan was especially impressed with "the relatively low costs and high benefit ratios. It's good to see money going into projects like that," he said.

However, he said Land and Water Conservation funds "do not come from a bottomless pit."

After expenditures on state parks, he said, Albany would have about \$6 million in federal

funds to divvy up among competing local governments in the state.

**MOST ATTENDING** the meeting approved the proposal but questioned if it would end up on the shelves like previous waterfront improvement plans.

John H. Bunz, environmental chairman of the State Conservation Council, said his organization is opposed to that part of the proposal that calls for a ferry stop on Strawberry Island.

"We would like to see the island left in its present state of non use," he said. "To open it to the public would not be wise in light of the erosion over the past 4 years."

Col. Hughes said the Corps has no jurisdiction over the island and the ferry service proposal is the only part of the plan not eligible for federal matching funds.

HENRY J. NOWAK  
27TH DISTRICT, NEW YORK

COMMITTEE:  
PUBLIC WORKS AND  
TRANSPORTATION  
DISTRICT OF COLUMBIA

ROOM 1223  
LONGWORTH HOUSE OFFICE BUILDING  
TELEPHONE: (202) 225-3306

HOME OFFICE:  
U.S. COURTHOUSE  
BUFFALO, N.Y. 14202  
TELEPHONE: (716) 653-4131

# Congress of the United States

## House of Representatives

Washington, D.C. 20515

November 4, 1975

Colonel Bernard Hughes  
Corps of Engineers  
1776 Niagara Street  
Buffalo, N.Y. 14207

Re: Corps of Engineers Waterfront recreation/  
rehabilitation plan.

Dear Colonel Hughes:

I regret that my official duties in Washington prevent me from attending the public meeting on the Corps of Engineers' proposed waterfront recreation and rehabilitation plan.

The Corps should be commended for devising what I believe is an exciting and imaginative blueprint for action.

The potential recreational benefits alone of these suggested projects justify widespread community support. Their completion, however, could act as a catalyst for other private and public development that would add immeasurably to our community's vitality and attractiveness as an investment area. The rippling effect prospects of these Corps of Engineers' proposals, therefore, demands solid support.

I pledge to do all I can to work with local, state and federal officials to help fashion a funding package for this effort.

Best wishes,

HENRY J. NOWAK,  
Member of Congress

JOHN J. LaFALCE  
2nd District, New York

COMMITTEE ON  
BANKING, CURRENCY AND  
HOUSING

COMMITTEE ON  
SMALL BUSINESS

417 CANNON BUILDING  
WASHINGTON, D.C. 20515  
(202) 225-3231

FEDERAL BUILDING  
BUFFALO, NEW YORK 14202  
(716) 842-2880

MAIN POST OFFICE PLAZA  
NIAGARA FALLS, NEW YORK 14205  
(716) 284-9976

# Congress of the United States

## House of Representatives

Washington, D.C. 20515

November 3, 1975

Hon. Raymond T. Schuler, Commissioner  
NYS Department of Transportation  
State Campus  
Albany, New York 12226

Dear Ray:

When the Niagara Section of the New York State Thruway was built the citizens of the "Riverside" section of Buffalo found that they lived in a community which, for all practical purposes, was mis-named. For they no longer were able to enjoy their proximity to the Niagara River -- the Thruway was then, and remains today, an impregnable concrete barrier between the people and what would otherwise be a prime recreational resource for this neighborhood.

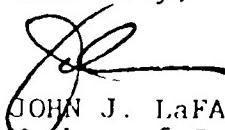
During the past session of the State Legislature a bill authorizing a pedestrian bridge over the Thruway to permit access to the River from the community was passed. I am hopeful that the promise to rectify the situation implicit in that bill can be implemented at the earliest possible date.

I trust that DOT and the Thruway Authority are working together to make sure that expeditious action can take place. I would appreciate your sending me an up-to-date status report on this along with your best estimate on when work will start and when it may be completed.

Thank you for your attention to this matter.

Best regards,

Sincerely,



JOHN J. LaFALCE  
Member of Congress

NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION  
Raymond T. Schuler, Commissioner



Region 5 Office 125 Main Street, Buffalo, New York 14203

October 16, 1975

Howard C. Hughes  
Colonel, Corps of Engineers  
District Engineer  
Buffalo District, Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Sir:

Comprehensive Portion  
Buffalo Metropolitan Area Study

In reply to your letter of October 3, 1975, we are generally in favor of the various measures discussed at the September 26, 1975, meeting. Our major concern is that the above measures be compatible with our Riverside Ramps project. The ramp locations being considered at this time are as follows:

Southbound Off Ramp - Hertel Avenue or near Ontario Street

Northbound On Ramp - Hertel Avenue or Ontario Street

In the near future a design report discussing this project will be released. You will receive a copy of this report.

In regards to the Pedestrian Overpass in the vicinity of Riverside Park, it is presently legislated as a responsibility of the New York State Thruway Authority.

It is our opinion that the New York State Department of Transportation could not participate in the funding of any of the projects contained in the Buffalo Metropolitan Area Study.

Should you have any further questions feel free to contact this office.

Very truly yours,

D. H. KITCHUA, Regional Director

By

  
D. L. Heineman, Regional Design Engineer

DTH:LPL:lsf



THE SENATE  
STATE OF NEW YORK  
ALBANY 12-24

JAMES T. McFARLAND

50TH DISTRICT

CHAIRMAN

COMMITTEE ON CORPORATIONS,  
AUTOMOTIVE & PUBLIC UTILITIES  
(518) 472-8081

65 COURT STREET, ROOM 214  
BUFFALO, NEW YORK 14202  
(716) 842-2169

October 13, 1975

Bernard C. Hughes  
Colonel, Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Colonel Hughes:

I read with interest the disposition of the meeting on the comprehensive portion of the Corps Metropolitan Area Study for Buffalo.

I am indeed interested in your keeping me abreast of any development plans the Corps may have regarding the pedestrian overpass bridge in Riverside. As the State Senator representing that area, I have worked vigorously for the past four years trying to obtain an appropriation to have this bridge built. As you are probably aware, the New York State Legislature this year approved \$350,000 for this purpose.

I would also be very interested in any plans regarding the bicycle path from Riverside Park to Isle View Park.

With many thanks and kind personal regards, I remain

Very truly yours,

  
JAMES T. McFARLAND

JTM:dj

CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO EVENING NEWS - 30 Oct 75

## Corps' Plans for River Get Favorable Reaction

By PAUL MAC CLENNAN

*News Environmental Reporter*

The U.S. Corps of Engineers reported today that it has had generally favorable response from citizens and governmental units on its \$4.8 million waterfront recreation and rehabilitation plan.

Two meetings are set in the next three weeks to discuss over-all problems of the riverfront. The Corps will hold a public meeting at 7 PM Wednesday in the Buffalo Museum of Science when Col. Bernard C. Hughes will discuss its proposals.

Erie County's Open River Advisory Committee, following almost 2 months without a public session, will resume work at a meeting called for 7:30 PM Nov. 21 in County Executive Regan's office.

**MR. REGAN** said today that substantial agreement has been reached with Mayor Makowski to expand the committee into a city-county co-operative endeavor.

On the negative side, however, there is growing concern that one central agency or a co-operative panel should be established to co-ordinate activities of the city, county, Regional Planning Board and the Corps.

It was also learned that Dr. Wayne Hadley, co-chairman of

the county's Open River panel, has resigned his post voicing disappointment that the group has not been given facilities and personnel to carry out its assignment.

The Buffalo Evening News also learned that despite passage by the State Legislature of a bill providing for construction of a pedestrian overpass connecting Riverside Park with the waterfront, the measure is now tied up in a tangle between the State Thruway Authority and state Department of Transportation.

**JOSEPH HASSEY**, a civil engineer with the Corps, said today that the agency has received a dozen letters from various groups and citizens commending the Corps for its waterfront study and pledging cooperation.

One problem in carrying out the plan is the fact that the Corps cannot fund a majority of the proposals and its role would be largely that of a coordinator. Mr. Hassey said a representative of the U. S. Bureau of Outdoor Recreation has been invited to Wednesday's meeting. The bureau has voiced interest in the Corps study and indicated some federal funds might be available for phases.

In a related development, Mr. Regan and Mayor Sheridan Creekmore of Tonawanda are prepared to move ahead with a bikeway connecting a county-city park along the river with Sheridan Park in the Town of Tonawanda and Riverside Park. The Buffalo Common Council is also discussing proposals for relocating the West Side Rowing Club into Davis Point, a portion of the old Erie Canal that some groups say should be preserved as a park.

HQDA (DAEN-PAI) - 2

NCDPA - 2

J. Hassey - 1



IN REPLY REFER TO

## United States Department of the Interior

### BUREAU OF OUTDOOR RECREATION

#### DEPUTY REGIONAL OFFICE

De Leve Building - Room 910

One Arch Street

Philadelphia, Pennsylvania 19106

Colonel Bernard C. Hughes  
District Engineer  
Buffalo District, Corps of Engineers  
1776 Niagara Street  
Buffalo, NY 14207

84 07

Dear Colonel Hughes:

This letter is a follow-up to my staff's September 23, 1975 meeting, and more recent telephone conversations, with Joe Hassey of your staff, regarding the Comprehensive Study portion of the Buffalo Metropolitan Area Study.

On the basis of information provided to us, it appears that most of the outdoor recreation features of the development plan meet our eligibility criteria for matching assistance from the Land and Water Conservation Fund. Exceptions would include the proposed Ferry Service, and work related to normal maintenance functions. This has been discussed in more detail with Mr. Hassey.

With regard to your November 5, 1975, public meeting, Bernard Fagan of my staff will likely be in attendance to offer technical assistance in the matter of Land and Water Conservation Fund grants. I hasten to add, however, that the Regional State Parks and Recreation Commission staff have expertise in this area and would be the first line of contact for any community seeking Fund assistance.

I would like to commend you and your staff for your efforts in identifying potential recreation opportunities in the Buffalo area. We are certain that worthwhile facilities will result.

Sincerely yours,

*Patting M. Corbin*

DEPUTY Regional Director





NIAGARA FRONTIER STATE PARK & RECREATION COMMISSION  
Principal State Agency for the Development of Parks and Recreation Areas in Western New York

Regional Office - Buffalo  
P.O. Box 1200 - Buffalo, New York 14240

October 17, 1975

Colonel Bernard C. Hughes, District Engineer  
U. S. Army Corps of Engineers  
Buffalo District  
1776 Niagara Street  
Buffalo, New York 14207

Re: Buffalo Metropolitan  
Area Study

Dear Colonel Hughes:

Regarding your letter of October 3, relative to Parks' interest in the Study, I offer the following comments:

The projects, as described in the Study, are municipal projects and not within State Park authority. However, if these projects are eligible for BOR assistance and if the municipality where the project is located elects to implement the project and request assistance, Parks will act as the agency processing the application.

The report is well done and the projects appear feasible.

Very truly yours,

*Keith R. Hopkins*  
Keith R. Hopkins  
Regional Administrator



Kenmore, New York 14217 • main post building • 877-2360

October 17, 1975

Colonel Bernard C. Hughes  
District Engineer  
Corps of Engineers  
1776 Niagara St.  
Buffalo, N.Y. 14207

Dear Sir:

As Councilman and Chairman of the Waterfront Committee,  
I am indeed interested in the development of the Niagara  
River and its potential as a recreation area and a beauti-  
ful environment.

Sincerely yours,

*Wilfred Goddard, Jr.*  
Wilfred Goddard, Jr.  
Councilman

WGJr:s  
Fncl.

Supervisor DALE L. DAVIS

Councilmen STEPHEN MISTER, WILFRED GODDARD, JR., HARRY E. GORE, THOMAS J. KELLY, F. WILLIAM MEEHAN, GORDON ST. PETERS, ROBERT RICHARDSON



Kenmore, New York 14217 • Municipal Building • 877-8800

10/17/75

- PRO 1. Our Recreation Department is at the present time constructing bike paths. Also a study of connecting bike paths between Buffalo and City of Tonawanda, is being made.
2. Consideration of erosion control for Strawberry Island - Ferry dock - stop off dock for travelers - Great Lakes - canal - Atlantic Ocean.
- CON 1. The proposed new park land development at Riverside Park, I am concerned about because it is a threat to Strawberry Island and might affect the flow and flood stage of the Niagara River causing problems to the Town of Tonawanda.

JAMES L. BUCKLEY  
NEW YORK

United States Senate  
WASHINGTON, D.C. 20510

October 16, 1975

Bernard C. Hughes  
Colonel, Corps of Engineers  
District Engineer  
Department of the Army  
Buffalo District Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Colonel Hughes:

Senator Buckley has asked me to thank you for your kind invitation to attend a public meeting on the Corps comprehensive water resources study of the Buffalo Metropolitan area. Although he is unable to attend the meeting, Senator Buckley has asked that I represent him. I will forward all information and comments from the meeting to Senator Buckley and to Ms. Marge Sentiff of our Rochester Office. As you know, Ms. Sentiff handles Corps of Engineers liaison work for the Senator and I am sure that she will be very interested in the results of your November 5th meeting.

I look forward to our discussion.

Best wishes,

Sincerely,

Mary Sheila Gall  
Special Assistant to  
Senator James L. Buckley

Buffalo Regional Office  
Statler Hilton Building  
Buffalo, New York

**STATE UNIVERSITY COLLEGE AT BUFFALO**  
1300 ELMWOOD AVENUE • BUFFALO, N. Y. 14222 • Telephone 716 862-5422



16 October 1975

Robert A. Sweeney, Director

Col. Bernard Hughes, District Engineer  
Buffalo District - U.S. Army Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Re: Proposed (1975) Buffalo Waterfront Improvements

Dear Col. Hughes:

Neither I nor any members of my staff will be able to attend the November 1975 hearing regarding the above. Therefore, we are submitting our comments in writing.

The Great Lakes Lab fully supports the Corps proposals to improve shoreline protection, provide additional park and recreational areas as well as promote the initiation of a waterfront ferry service. Through our numerous research contracts in the Great Buffalo area, including the Niagara River for the Erie-Niagara Counties Regional Planning Board, we have recognized a decline in the utilization of these aquatic resources at a time when the quality of the water is rapidly improving. We also were among the first to point out that the existing transportation systems and other construction along the Buffalo Harbor and Niagara River were functioning unintentionally as "Great China walls" to isolate the people from the waterfront. Your proposals, if funded, will be a major step in remedying this problem.

We do not believe that there would be major environmental disruptions (in terms of area and/or duration) that would result if the proposed construction was carried out. In contrast to the environmental benefits, the short-termed negative impacts of the alterations would be insufficient.

Sincerely,

Dr. Robert A. Sweeney  
Director, GLL

AG:dnk



# The Council

CITY OF BUFFALO

JOHN P. REVILLE, JR  
COUNCILMAN NORTH DISTRICT  
1404 CITY HALL  
BUFFALO N.Y. 14202

October 14, 1975

Col. Bernard C. Hughes  
Corps of Engineers  
District Engineer  
1116 Niagara Street  
Buffalo, New York 14201

Dear Col. Hughes:

Thank you for your letter of October 3, and the minutes from the September 30, 1975 meeting.

I am definitely interested in the many proposals you are discussing regarding the river front. A part of my councilmanic district is bounded by the Niagara River.

Many of my constituents are very concerned about the Niagara River projects and I would like to be kept abreast of all information you will be taking into consideration on this area in the future.

Please keep me advised of upcoming meetings. If I find that my schedule does not allow for attendance, I would appreciate receiving a copy of the minutes so that I will be aware of the progress being made.

Once again, thank you for the minutes of the last meeting. I look forward to hearing from you again.

Sincerely,

JPK/LMP

John P. (Jack) Reville, Jr.  
North District Councilman



## Town of Cheektowaga

TOWN HALL - BROADWAY AND UNION ROAD - CHEEKTOWAGA, NEW YORK 14227

CHESTER L. BRYAN, P.E.  
TOWN ENGINEER  
716-693-2200

October 10, 1975

Colonel Bernard C. Hughes  
U.S. Corp of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Colonel Hughes:

The recreation plan for the Buffalo Metropolitan area as outlined at your September 26, 1975 meeting was well-planned and presented. All of the projects appear sound and would undoubtedly benefit the area. While we would like to see the program implemented, we feel that we have no voice on the projects since the Town of Cheektowaga would not be financially involved in making the projects a reality. The Town is, however, interested in utilization of Cayuga Creek flood plain areas for recreational purposes in order to prevent other types of development.

Very truly yours,

TOWN OF CHEEKTOWAGA

*Chester L. Bryan*  
Chester L. Bryan, P.E.  
Town Engineer

CLB:tw



## County of Erie

EDWARD V. REGAN  
COUNTY EXECUTIVE

### DIVISION OF PLANNING

Charles O. Brown  
Director

PHONE: 716-846-8390

October 8, 1975

Col. Bernard C. Hughes, District Engineer  
Buffalo District, Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Attention: Charles Gilbert

Dear Mr. Gilbert:

This letter is sent to you as per your request of September 26, 1975. It is in regard to the Corps of Engineer's Comprehensive Feasibility Study of water and related land management for the Buffalo metropolitan area.

The Division of Planning agrees with the general concepts of bikeways and water related recreational facilities which were described by your staff during the September 26th meeting. The Division of Planning will be pleased to review the Comprehensive Feasibility Study document as soon as it is made available.

While we cannot endorse any of the projects specifically until we have additional information, we agree that greater use of the waterfront related areas for recreation in this area is important. As noted at the meeting, coordination of such projects is extremely important.

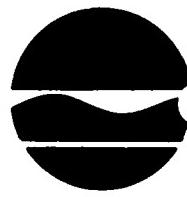
We want to thank you for giving us the opportunity of meeting with you and representatives of the other organizations present for the presentation of the Corp's study.

Very truly yours,

CHARLES O. BROWN  
Director

mh

**New York State Department of Environmental Conservation**  
Region 9 - Fish and Wildlife Office  
128 South Street  
Olean, New York 14760



Ogden Reid,  
Commissioner

October 8, 1975

Bernard C. Hughes  
Colonel, Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Sir:

Following the meeting of September 26, 1975 in your office, we would like to commend you on an excellent job with the Corps Buffalo Metropolitan Area Study.

In a general sense, most of the proposed improvements to urban fishing and recreation would be quite beneficial. The manner of accomplishing these ends is still unstated and therefore we would reserve the right to oppose certain specifics. Due to the efforts of this Department to improve fishing opportunity in the Niagara River, we would welcome reconstruction of the Bird Island Pier and improve access at Riverside Park. As stated in previous meetings, we would oppose the original massive fill at Riverside Park, but find less fault with the reduced fill discussed at later meetings.

Rehabilitation of Delaware Park Lake, done in an environmentally acceptable manner, would be beneficial from a fisheries standpoint. Achievement of this rehabilitation would be followed by a complete survey of the lake by this unit and recommendations for a fish management plan.

Additional fisheries resources and fisherman access are prime interests of this Department, and we hope many of the aspects of your study are finally implemented.

Sincerely,

Charles N. Frisa  
Regional Fisheries Manager  
Region 9 - Olean

CNF/des

7/18  
CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO EVENING NEWS - 30 Sep 75

## Attractive Plan for Waterfront

An attractive and imaginative \$4.8 million plan for improving recreational facilities along the Niagara River and Buffalo Harbor has been proposed by the U.S. Corps of Engineers. As a major step forward in opening up the shoreline for public enjoyment, it merits the support of both Erie County Executive Regan and Mayor Makowski.

Buffalo has recently begun to reclaim and improve its sadly neglected waterfront lands, but a great deal remains to be done. The proposed plan, part of a larger, comprehensive study of regional flood control and recreational needs, would create new opportunities for fishing, biking, hiking, boating and ferry service. Under the corps proposal, devel-

opment would start immediately on a \$1.5 million first phase using funds from a variety of state, local and federal sources.

For a long time the Buffalo area almost completely ignored public development of its waterfront resources — in contrast to other Great Lakes communities. Highly promising long range shoreline plans are now in the works, but the pending corps program looks like something that might be undertaken without delay. It is particularly attractive because all of the proposed new facilities would be highly accessible to urban populations most in need of expanded recreational facilities. Such improvements also would contribute to the hoped-for expansion of the region's tourist trade.

In short, this plan looks too good and too practical to be relegated to some planning pigeonhole, and it is up to city and county officials to take the lead in insuring that it enjoys a worthier fate.

HQDA (DAEN-PAI) - 2

NCDPA - 2

PBfg Br/NY Basin - 1

CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO COURIER EXPRESS - 27 Sep 75

### Army Corps' Waterfront Role Limited

The U.S. Army Corps of Engineers would have a limited role in implementing a \$4.8-million waterfront recreation plan that it has produced, it was stressed on Friday.

Joseph Hassey, a Corps engineer who developed the plan, told about 25 state, county, city and town officials that the only major project the corps could

undertake would be the rehabilitation of the Bird Island Pier to improve safety.

Hassey said other projects, including parks development and construction of bicycle paths, would have to be sponsored by local governments with possible assistance from the U.S. Bureau of Outdoor Recreation and the State Office of Parks and Recreation.

✓ NY Basin/Hassey - 1



CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO COURIER EXPRESS - 25 Sep 75

### Waterfront Recreation Meeting Set

The U.S. Army Corps of Engineers has invited state, county, city, and town officials to a meeting on Friday to brief them on a \$48 million waterfront recreation plan.

Joseph Hassey, a civil engineer with the corps, who described the plan as "possibilities with specific cost estimates," said the session will be held at 2 Friday afternoon in the corps

offices, 1776 Niagara St. A public meeting is scheduled for 7 p.m. on Nov. 5 in the Buffalo museum of Science.

The first phase of the plan, which would require funding from a variety of agencies, calls for landscaping and construction of a bicycle path in Riverside Park, safety improvements to the Bird Island Pier and a bike path on Squaw Island.

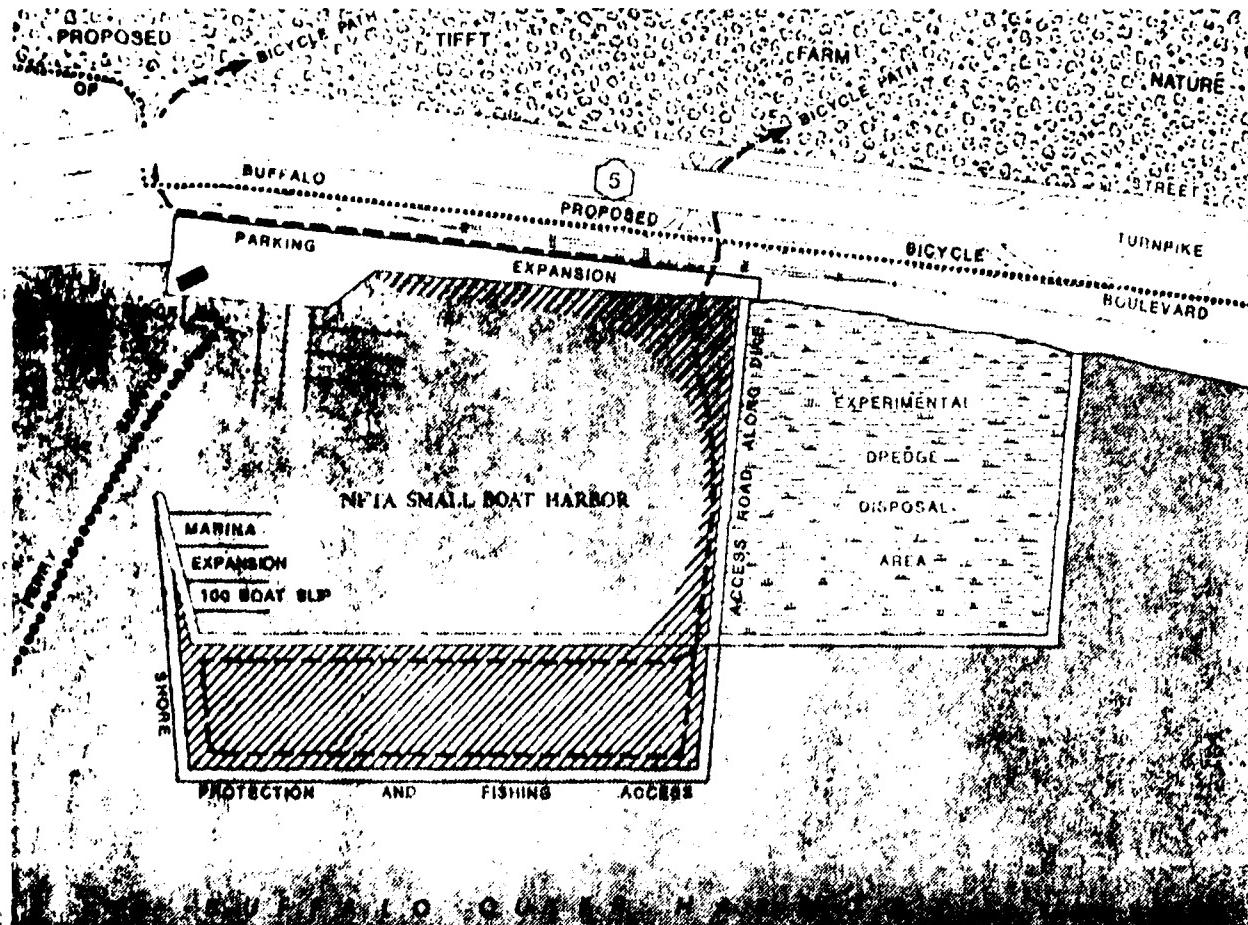
CF:  
✓ Hassey - 1

\* +  
CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO EVENING NEWS - 24 Sep 75

# Public-Access Plan for Waterfront Explained



**HARBOR JOB** — The U. S. Corps of Engineers, as part of a \$1.3 million Niagara River-Buffalo Harbor recreational face-lifting, has proposed a \$172,000 project to rehabilitate the Small Boat Harbor dikes, expand them for biking and fishing and build a bike path connection to the Tifft Farm Nature Sanctuary. Marina

expansion would house 100 more boats and a proposed waterfront ferry service would connect the site with downtown, points along the Niagara River and Beaver Island State Park. The adjacent Corps-operated dike disposal area would be converted when filled to park and picnic areas.

Ring Br/NY Basin - 1

BUFFALO EVENING NEWS - 24 Sep 75

## By PAUL MacCLENNAN

The U. S. Corps of Engineers disclosed details today of a \$4.8 million waterfront rehabilitation-recreation plan which would open up public access to the harbor and Niagara River shoreline for fishing, biking, boating and a new ferry services.

The Corps will seek co-operation of area officials at 2 PM meeting Friday in the Corps office for an immediate start on the first stage — a \$1.3 million program.

Much of the funding from the project would come from state, county, city and town budgets. The Corps said it will seek funding for a major rehabilitation of the Bird Island pier and some federal money might be available for recreation.

The report is one of four segments of a Buffalo Metropolitan Study for which Rep. Jack F. Kemp (R., Hamburg) secured \$700,000 for a comprehensive flood control-recreation study.

**RELEASE OF** the report follows by five days a series of proposals by the Erie & Niagara Regional Planning Board for a multi-million dollar recreational-industrial corridor from Lake Erie, up the Buffalo River, to West Seneca and Elma with a projected \$7.1 million trailway-recreation package.

Joseph Hassey, a civil engineer with the Corps, said their water-oriented recreation study was a continuation of a Regional Planning Board report on "The Urban River" providing a detailed analysis of costs and engineering feasibility.

Major recommendations for the early phase include:

—Rehabilitation and enlargement of the dike at the Niagara Frontier Small Boat Harbor to provide a bike path and fishing pier along the outer harbor. It would be expanded later to include a picnic area on an adjacent, nearly filled Corps disposal area. The cost: \$1.2 million.

—PURCHASE OF two 25 passenger boats and construction of nine ferry landing sites providing service between the Erie Basin Marina, the Small Boat Harbor, Squaw Island, Strawberry Island and Beaver Island State Park. The cost: \$160,000 plus \$55,000 a year to operate.

—Construction of a pedestrian overpass connecting Riverside Park to the Niagara River shoreline, establishing a bike path connecting Riverside Park with Isle View Park in Tonawanda via the riverfront, inland through Tonawanda Township to Two Mile Creek to the Isle View Park. Cost: \$327,000.

—Improvements to Bird Island pier including installation of a 6600-foot, 8-foot-wide concrete walkway and railing, plus another 3900 feet with handrails for the safety of fishermen. A hazardous weather warning system would caution fishermen of storms and high water. Buffalo already has a \$166,000 Broderick Park improvement project underway just north of the pier.

—CONSTRUCTION OF a bike path from the Erie Basin Marina to LaSalle Park and on to Day's Point, a tract of land on the river mouth of the Buffalo Yacht Club where a ferry landing site is proposed. The present seawall in LaSalle park would be replaced by a step wall.

—Extensions of the Delaware Park bike path to include along the right of way of a proposed Park Lake water tunnel bypass and a second path around the Buffalo Psychiatric Center.

In West Seneca, the Corps proposes construction of a \$50,600 bike and hiking path along Cazenovia Creek in conjunction with its flood control program. It would connect Cazenovia Park in South Buffalo to a nature trail area near the West Seneca Developmental Center.

The Corps said the first phase project would form the basis for an expanded water program once the key, first stage components were in place.

**THE BUFFALO** Metropolitan Study falls somewhat short of the \$103 million Urban River proposal unveiled by the Erie &

and Niagara Regional Planning Board in cooperation with Buffalo on Nov. 22, 1974.

However Mr. Hassey said the Corps' program includes engineering estimates, engineering considerations and projects which are economically feasible and can be implemented.

The Corps' proposal answers one criticism of county and state parks programs in that all of the proposed facilities are close to urban populations and accessible in many cases by public transportation. In addition it provides a ferry system connecting the facilities.

The study was done in part by Harza Engineering of Chicago. Harza did an earlier Erie-Niagara Water Resources study for the state.

**MR. HASSEY** said the study also identifies the government that would have responsibility for constructing and maintaining the facility. It is these state, county, city and town officials who will be invited to Friday's meeting.

Mr. Hassey said he will be holding talks also with representatives of waterfront industries to discuss possible easements or access through private property to waterfront sites. Included is a session with the Tonawanda Chevrolet Division of General Motors and Dunlop.

A public meeting is scheduled for Nov. 5.

Col. Bernard C. Hughes, district engineer, has asked for a final report by November. The three other phases of the study include flood control projects for Cazenovia, Cayuga and Tonawanda Creeks scheduled to be finished by June.

The regional planning board has completed a number of studies recommending creation of parks along creeks in the two counties, including ones in the Buffalo River watershed.

NEW YORK STATE PARKS & RECREATION



STATE OF NEW YORK

August 6, 1975

Mr. Joseph Hassey  
U.S. Army, Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Mr. Hassey:

Inclosed with this letter you will find a copy of our Final Recreation Development Program. Some of the projects mentioned in the report are bikeways which are similar to the recommendations the Corps is considering in the Buffalo metropolitan area. We too feel that the use of existing facilities for bikeways represents a high priority program providing additional benefits in the form of bicycling, walking, fishing, recreation and transportational uses.

I would suggest that initially you contact John Seager in my office and the regional offices of New York State Department of Transportation and the Department of Environmental Conservation to help coordinate further work on your proposals. Please let me know if further information will be helpful.

Sincerely,

A handwritten signature in black ink, appearing to read "Ivan P. Vamos".

Ivan P. Vamos, Director  
Planning and Research

TPV/djf

cc: John Seager

P.S. Enclosed you will find copies of a bikeway funding research effort which may be helpful for your work. I do not guarantee all of it to be correct, however, it should be a good start.

Ivan

CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO COURIER EXPRESS - 25 Jul 75

### River Victim's Body Found

A body discovered floating on the Niagara River near the foot of W. Ferry St. shortly after 11 a.m. Thursday was identified Thursday afternoon as that of Kelvin Simmons, 15, who drowned Saturday near the Peace Bridge.

Simmons of 14 Brighton Ave. slipped from a breakwall near the bridge.

His body was discovered, nearly half a mile away floating near the shore. It was recovered by the U.S. Coast Guard.

00-1  
C. Gilbert - 1

CORPS OF ENGINEERS

BUFFALO DISTRICT

BUFFALO COURIER EXPRESS - 18 July 75

## Youth Presumed Drowned

The treacherous river currents off the Bird Island breakwall between the Niagara River and the Black Rock Canal, apparently claimed another victim on Saturday as a 1 year-old East Buffalo boy was listed as missing and presumed drowned.

Calvin Simmons, 14, Brighton Ave., slipped and fell off the breakwall about 40 feet north of the Peace Bridge about 8 Saturday morning and was last seen floating past the foot of W. Ferry St.

W. Delavan Station police said Simmons and his brother Robert, 25, of the same address, had walked out along the breakwall from the West Side

Rowing Club to go fishing and the younger brother slipped on the wall where water runs over it.

A Coast Guard spokesman said the current in the swift running Niagara River apparently snatched the boy away from the breakwall and carried him "out into the middle of the river."

Persons at the Rowing Club told the Coast Guard they saw the youth's head go under as he passed the foot of W. Ferry St.

Although there were no reports of it, authorities said it was possible that the boy resurfaced and was not seen because he was so far from shore. However, they said, no sightings were reported later.

Although only one other man,

a swimmer, has drowned off the breakwall this year, authorities said that a number of bathers and fishermen are lost each year near there in the river, which has a current of between nine and 12 miles an hour in that area.

While searching for the boy, a Coast Guard boat pilot noticed five other fishermen stranded on the breakwall by rising water caused by high winds.

They were taken off the wall on a Coast Guard Auxiliary boat from the foot of Porter Ave. Rescued were:

Fred Racine, 14th St.; Jeffery Racine, 83 18th St.; Richard Zentra, 42 Woodette St.; James Zeigmyr, 344 Parkdale Ave.; and Terrance Loveland, 389 Prospect Ave.

C-O-1  
Gilbert

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

21 South Grove Street, East Aurora, New York 14052

June 26, 1975

Colonel Bernard Hughes  
U.S. Army Corps of Engineers  
1776 Niagara Street  
Buffalo, New York 14207

Dear Colonel Hughes:

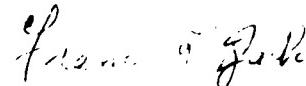
The U.S.D.A. Soil Conservation Service has been involved with and interested in streambank stabilization for many years.

Recently, we have been working with a task force from your office on coordination of a study for the Buffalo Metropolitan area. This joint effort should help improve services available to the public.

For streams within our responsibility, the SCS can provide technical assistance to landowners in solving streambank erosion and related problems.

We look forward to further cooperation in this problem area and will provide whatever services we can to your efforts.

Sincerely yours,



Francis L. Zaik  
District Conservationist

AD-A101 224

CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT  
BUFFALO METROPOLITAN AREA, NEW YORK WATER RESOURCES MANAGEMENT.--ETC(U)

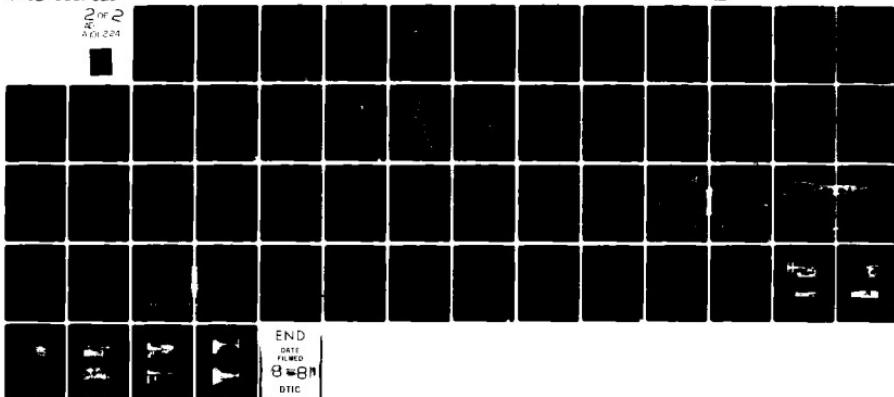
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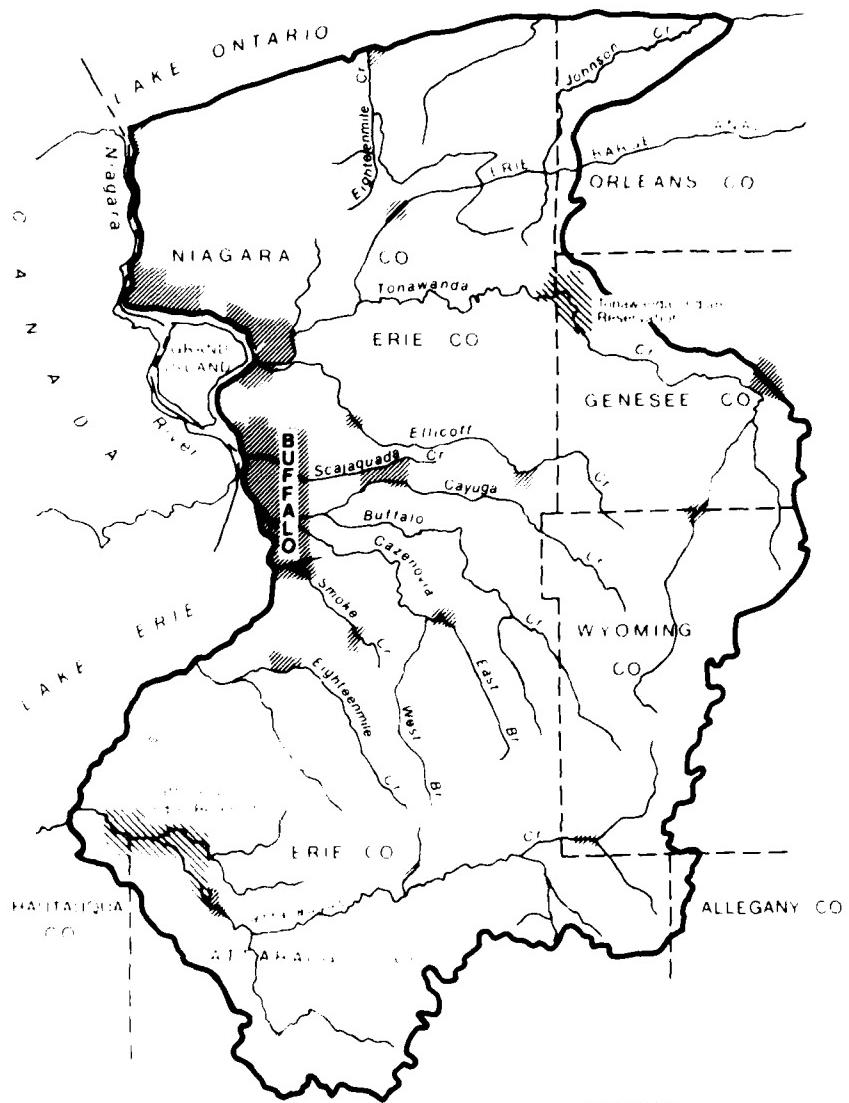
UNCLASSIFIED

2 of 2  
AD-A101 224

NL



END  
DATE FILMED  
8-88  
DTIC



#### LEGEND

■■■ Urban Area

▨▨▨ Indian Reservation

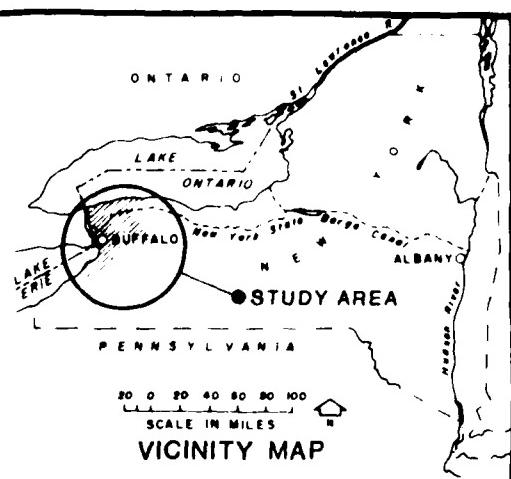
5 0 5 10  
Scale in Miles

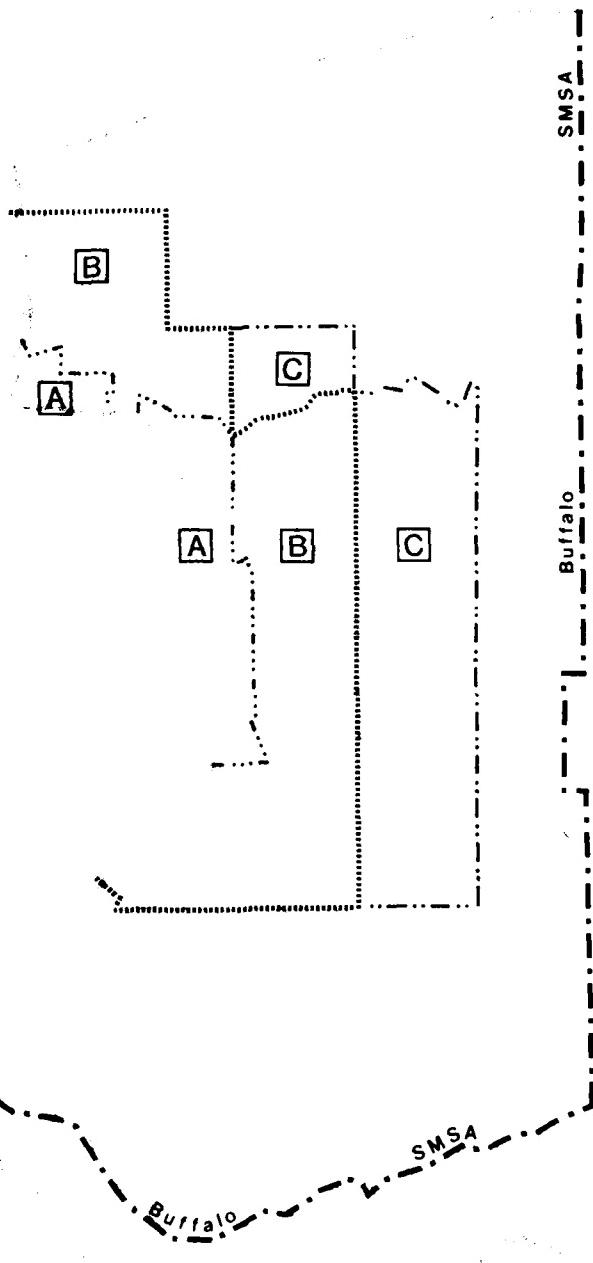


Buffalo Metropolitan Area - New York

### BUFFALO METROPOLITAN STUDY AREA

US Army - Corps of Engineers - Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975





5      0      5      10  
Scale in Miles



NORTH

LEGEND

..... Area A	- - - Buffalo SMSA
..... Area B	- - - Urban Area
..... Area C	- - - Indian Reservat

## DISTRIBUTION OF POPULATION IN URBANIZING PART OF STUDY AREA

	1970 Census Population <sup>2/</sup>	Percent of Study Area Population	Percent of Buffalo SMSA Population	Percent Projected Growth to Year 2000 <sup>3/</sup>
<b>AREA A</b> Cities of Buffalo, Lackawanna, Tonawanda, North Tonawanda, and Niagara Falls, and Town of Tonawanda	742,232	52%	55%	-12%
<b>AREA B</b> Towns of Hamburg, Grand Park, West Seneca, Cheektowaga, Amherst, Niagra, Westfield, and Lewiston	357,777	25%	27%	85%
<b>AREA A + AREA B</b>	1,100,009	77%	82%	20%
<b>AREA C</b> Towns of Aurora, Elma, Lancaster, Flanagan, and Pendleton	77,972	6%	6%	52%
<b>AREA A + AREA B + AREA C</b>	1,177,981	83%	87%	22%
Buffalo Metropolitan Study Area <sup>1/</sup> Buffalo SMSA (Erie and Niagara Counties) <sup>2/</sup>	1,422,200 1,349,211	100% 95%	100% 100%	

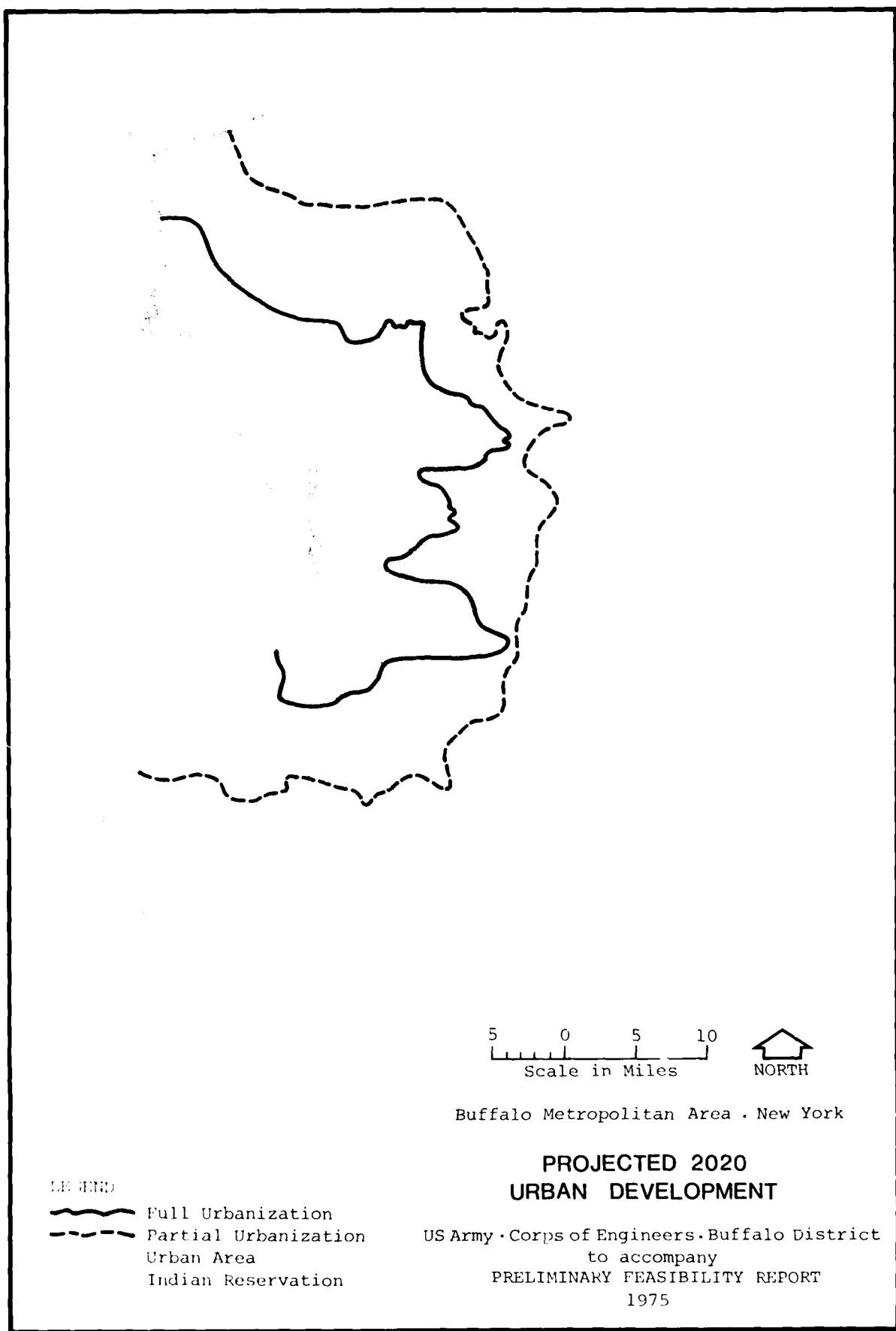
### NOTES

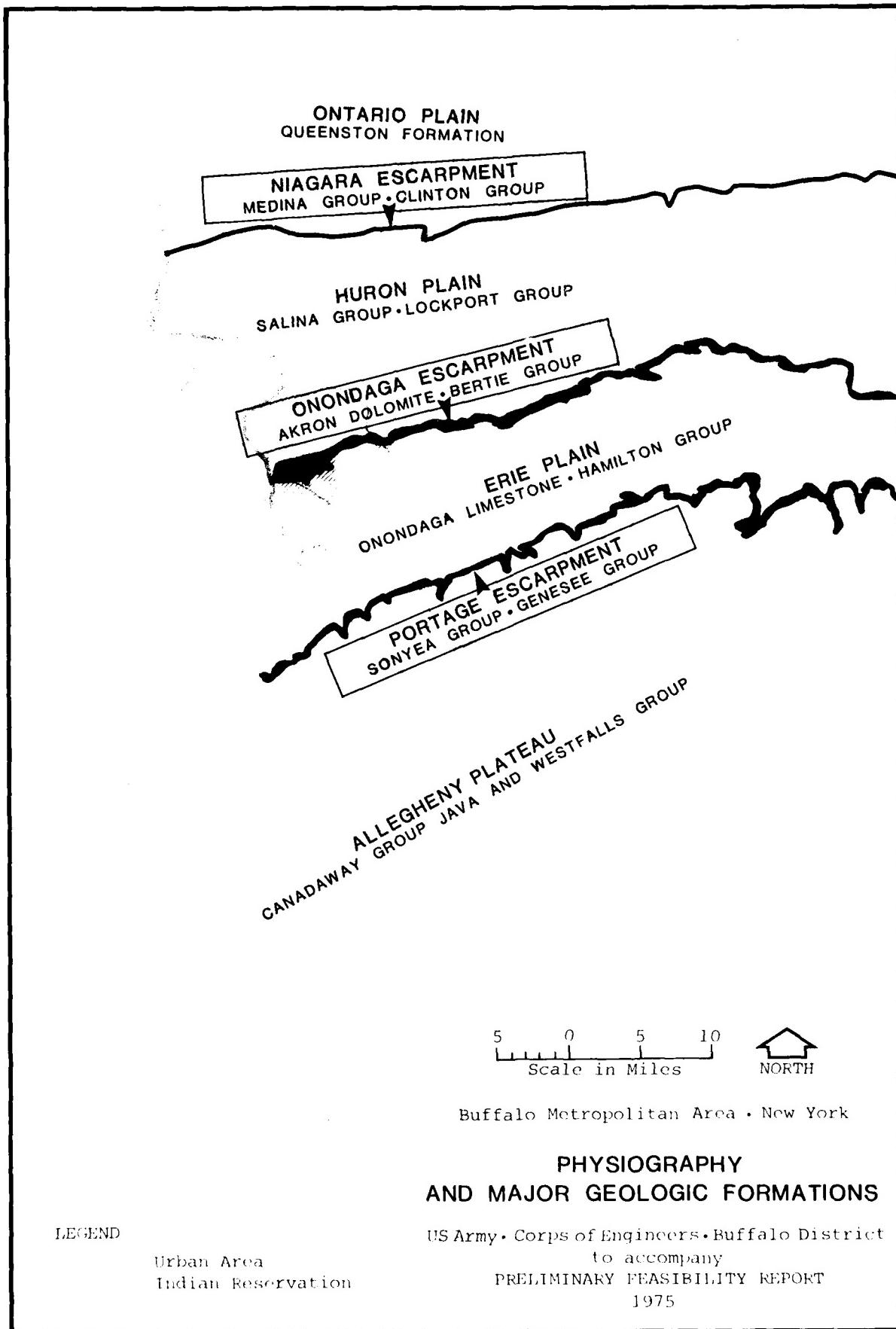
- 1 U.S. Army, Corps of Engineers, Buffalo Metropolitan Area Study, Plan of Study, Appendix, Part I
- 2 Erie and Niagara Counties Regional Planning Board (ENCRPB) Atlas of Regional Plans and Programs, Summary of Population Projections
- 3 ENCRPB Projections

Buffalo Metropolitan Area • New York

## POPULATION DISTRIBUTION

US Army • Corps of Engineers • Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975





04219000

04217500

04215900

04217000

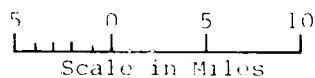
04215900 ● 04216200

04216000

04214500

04215500

04213500



NORTH

LEGEND

- ▲ USGS Stream Gage Site
- USGS Stage Record Site
- 04213500 USGS Gage Identification Number
- Urban Area
- Indian Reservation

**STUDY AREA  
PRINCIPAL STREAMS**

**TRIBUTARY TO:**

**LAKE ERIE:**

	Length in Miles	Elevation Source Feet	Elevation Mouth Feet	Drainage Area Sq.Mi.	Slope ft/mi.	Average Runoff <sup>1/</sup> cfsin	Drainage Area Above Gage Sq.Mi.
Cattaraugus Creek	68.9	1,900	573	544.00	19.26	1.86	25.30
Eighteenmile Creek	27.0	1,390	573	64.20	29.89		
South Branch	14.2	1,290	650		45.07		
Smoke Creek	14.5	1,000	573	8.55	39.10		
Buffalo River	8.1	590	573	436.00	2.10	1.67	22.61
Cayuga Creek	39.0	1,640	590	126.00	26.92		
Buffalo Creek	43.1	1,710	590	149.00	25.99		
Cazenovia Creek	17.5	810	575	138.00	13.43	2.07	28.17
West Branch	17.6	1,430	810	59.10	35.23		
East Branch	24.1	1,820	810	56.00	41.90		

**NIAGARA RIVER:**

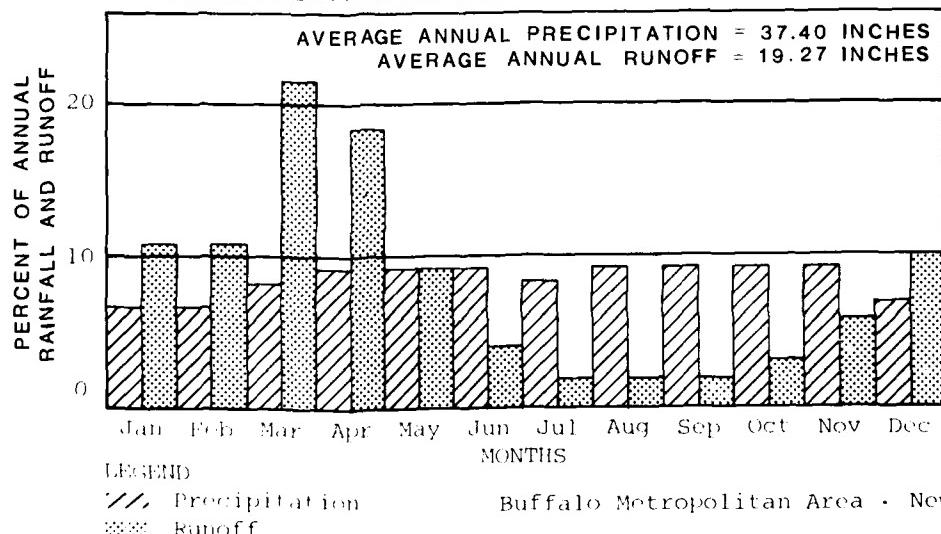
Seaj aquada Creek	35.1	570	247	-	9.20		
Tonawanda Creek	15.0	720	570	24.40	10.00		
Ellicott Creek	101.0	1,815	570	631.00	12.33	1.46	19.87
	40.0	850	570	110.00	7.00	1.69	22.99

**LAKE ONTARIO:**

Eighteenmile Creek	14.8	510	245	64.00	17.90		
Johnson Creek	31.3	619	247	109.70	11.88		

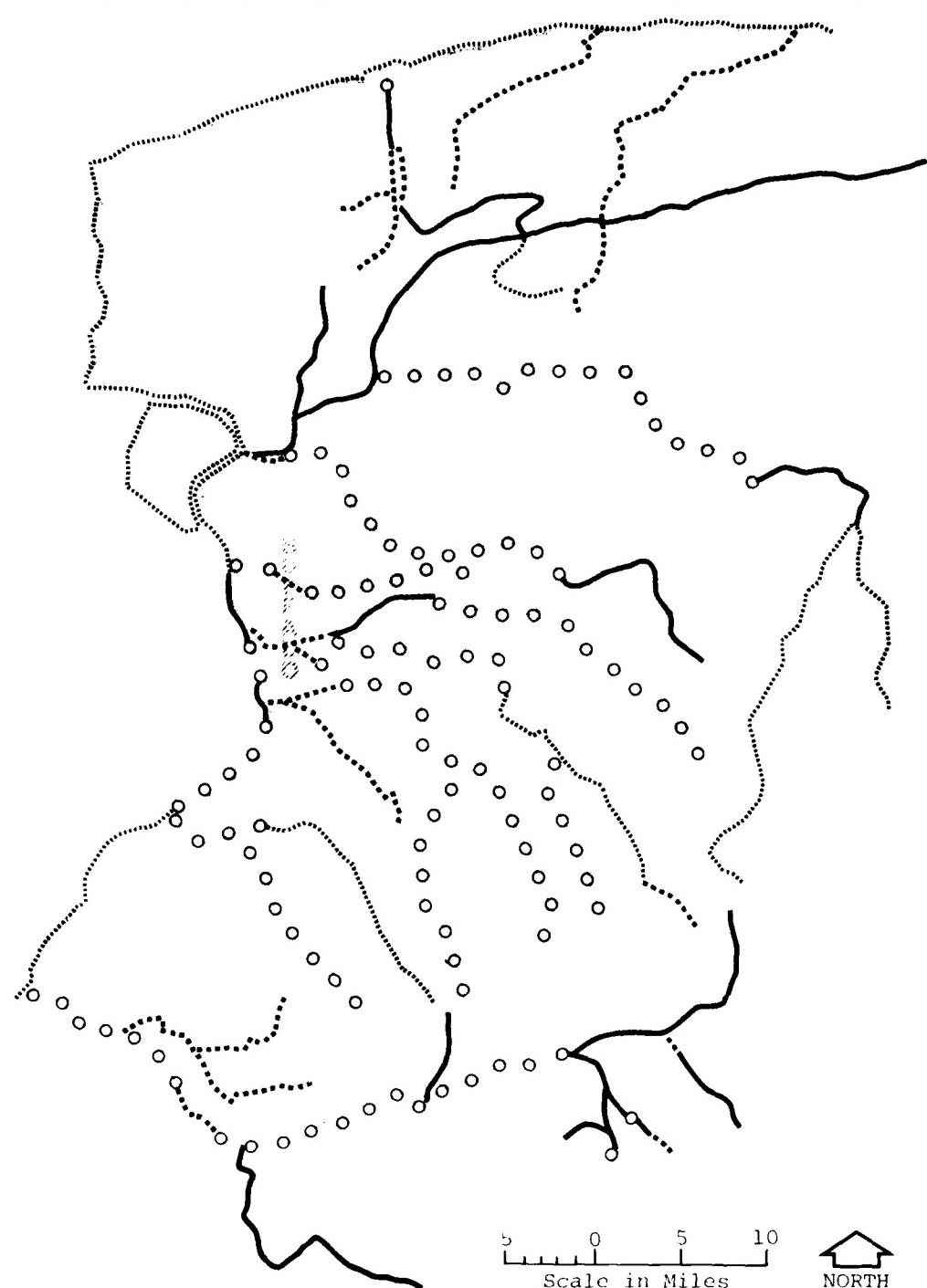
<sup>1/</sup> Average Runoff at gage. Source: Water Resources Data for New York, Part 1. Surface Water Records, U.S. Geological Survey

**TOTAL PRECIPITATION AND RUNOFF FROM STUDY AREA**



**RAINFALL AND RUNOFF**

US Army - Corps of Engineers, Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975



Buffalo Metropolitan Area • New York

LEGEND

- ..... Class A
- ○ ○ ○ Class B
- Class C
- ..... Class D
- Urban Area
- Indian Reservation

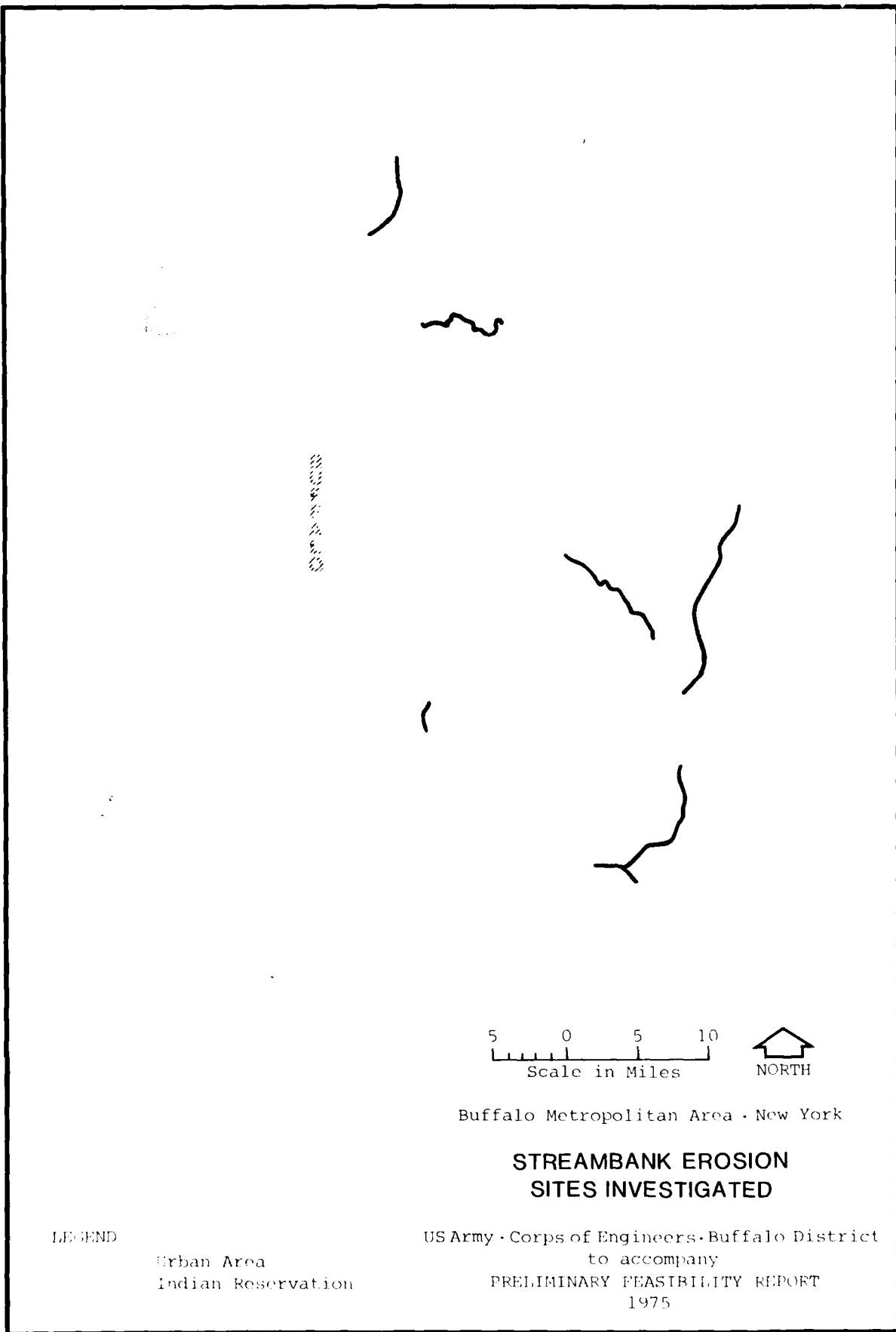
**STREAM CLASSIFICATION**

US Army • Corps of Engineers • Buffalo District

to accompany

PRELIMINARY FEASIBILITY REPORT

1975



## REGIONAL STOCKING PROGRAM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

### 1975 GREAT LAKES STOCKING - REGION 9

<u>Location</u>	<u>Species and Number</u>
Lake Erie	
Cattaraugus Creek	Chinook, fingerlings 50,000
Eighteenmile Creek and South Branch	Coho, yearlings 50,000
Chautauqua Creek	Coho, yearlings 25,000
Dunkirk Harbor	Coho, yearlings 15,000
	Chinook, fingerlings 50,000
	Coho, yearlings 10,000
Total	200,000
Lake Ontario	
Olcott-Wilson Area	Brown Trout, yearlings 40,000
Eighteenmile Creek	Chinook, fingerlings 75,000
	Coho, yearlings 20,000
Total	135,000

### 1975 URBAN POND STOCKING OF CALICO BASS

<u>Location</u>	<u>Number Stocked</u>
Niagara County	
Hyde Park Lake	2,000
Jos. Davis State Park Pond	1,000
Erie County	
Sheridan Park Lake	2,000
South Park Lake	2,000
Williamsville Pond	2,000
Como Park Lake	2,000
Akron Falls Park Pond	1,000

## LIST OF TROU

NEW YORK STATE DEPARTMENT OF E

### Stream

### Section

#### ERIE COUNTY

##### Buffalo Creek Watershed

Buffalo Creek  
East Branch Cazenovia Creek  
East Branch Cazenovia Creek  
Little Buffalo Creek  
Buffalo Creek, Tributary 69

Tributary 64 (above Wyoming County line) to  
Tributary 8 to Tributary 24  
Tributary 22 (Holland) to Source  
Tributary 4 (just above Clinton Street) to 0  
Entire Stream

##### Eighteenmile Creek Watershed

Eighteenmile Creek  
South Branch Eighteenmile Creek

Tributary 60 to Source  
New Oregon to Source

##### Cattaraugus Creek Watershed

Cattaraugus Creek  
North Branch Clear Creek  
Clear Creek, Tributary 9  
Sudmeyer Creek  
Kelly Brook  
Derby Brook  
Spring Brook  
Hosmer Brook  
Cattaraugus Creek, Tributary 51

Tributary 41 (just above Hecht Bridge) to Wy  
Mouth to Tributary 6  
Lower one mile  
Entire Stream  
Entire Stream  
Entire Stream  
Pond 115 at Springville to Source  
Entire Stream  
Mouth to Wyoming County line

#### WYOMING COUNTY

##### Niagara River Watershed

Tonawanda Creek  
Little Tonawanda Creek  
Little Tonawanda Creek, Tributary 8  
East Fork Tonawanda Creek  
Perry Brook

Tributary 66 at Varysburg to 0.5 miles above  
Tributary 8 to Dale  
Lower 0.25 mile  
One mile below Tributary 3 to Tributary 4  
Lower one mile

##### Buffalo Creek Watershed

Beaver Meadow Creek  
Fitzgerald Brook  
Fitzgerald Brook, Tributary 2  
Fitzgerald Brook, Tributary 1 of 2

Mouth to Tributary 2  
0.5 miles below Tributary 2 to Tributary 3  
Mouth to Tributary 1  
Entire Stream

##### Cattaraugus Creek Watershed

Cattaraugus Creek  
Cattaraugus Creek, Tributary 51  
Clear Creek  
Monkey Run  
Hiram Lake Outlet  
Flynn Brook  
Flynn Brook, Tributary 2  
Witherill Brook  
Witherill Brook, Tributary 2  
Witherill Brook, Tributary 1 of 2

County line (just above Yorkshire) to Java L  
Erie County line to Source  
Mouth at Arcade to Cattaraugus County line  
Tributary 3 to Source  
Entire Stream  
Mouth to Tributary 4  
Entire Stream  
Mouth to Tributary 2  
Entire Stream  
Entire Stream

1/ NSA- Natural Spawning Adequate

2/ Number in parenthesis represents the number of miles stocked

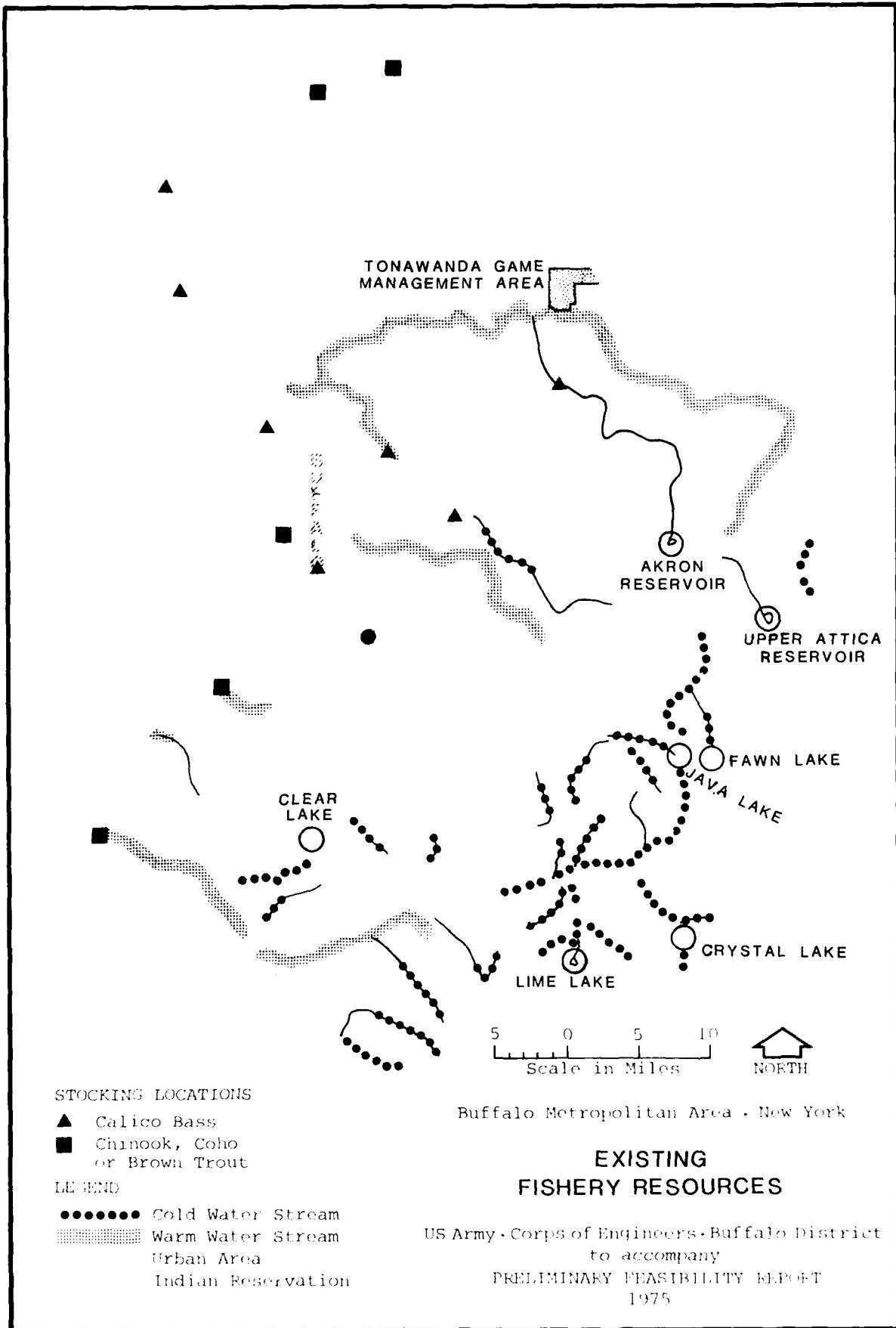
3/ This listing does not include salmon stocking in Eighteenmile and Cattaraugus Creeks.

## OF TROUT WATERS

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

<u>Section</u>	<u>Mileage</u>	<u>Status</u>
ty line) to Tributary 69	2.5 1.3 6.0	NSA 1/ Stocked (13) 2/ NSA
Street) to 0.2 miles above Tributary 10 at Marilla	3.5 2.0	NSA, Posted NSA
	2.0 4.3	NSA NSA
ridge) to Wyoming County line, above Yorkshire	7.9 4.5 1.0 2.2 1.0 4.8 3.5 4.0 2.5	Stocked (7.0) 2/ NSA, Rainbow Runs NSA, Rainbow Runs Posted Posted NSA NSA Stocked (2.0) 2/ NSA
miles above Southburg	9.0 3.2 0.25	NSA, Stocked (5.0) 2/ Stocked (3.2) 2/ NSA
ibutary 4	1.5 1.0	NSA NSA
ributary 3	4.5 1.5 0.4 0.6	Stocked (4.5) 2/ NSA NSA NSA
) to Java Lake	11.5 1.8 1.6 2.0 1.7 2.5 1.5 1.0 0.8 0.3	Stocked (11.2) 2/ NSA NSA, Stocked NSA NSA NSA NSA NSA NSA NSA

eeks.

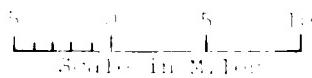


# STREAM RIGHTS ACQUISITION PROGRAM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

<u>Location</u>	<u>Additional Miles Recommended for Purchase (1975)</u>	<u>Miles Purchased to Date (April 1975)</u>
<b>ERIE COUNTY</b>		
Eighteenmile Creek	6.0 (Mouth up 6 miles)	None
Cattaraugus Creek	4.86 (Tributary 41 to Wyoming County line)	2.14
Hosmer Brook	0.06 (Entire Stream)	1.94
Spring Brook	3.5 (Pond 115 at Springville to Source)	None
<b>WYOMING COUNTY</b>		
Cattaraugus Creek	4.50 (Wyoming County line to Java Lake)	6.95
Flynn Brook	None	0.41
Clear Creek	None	0.60
<b>CATTARAUGUS COUNTY</b>		
Cattaraugus Creek	5.67 (Tributary 41 to Wyoming County line)	2.23
Lime Lake Outlet	0.763 (Entire Stream)	3.737
McKinstry Creek	1.88 (Entire Stream)	2.62
Clear Creek	0.67 (Entire Stream)	3.56
Elton Creek	10.96 (Mouth to Tributary 16)	4.34
Mansfield Creek	0.90 (Mouth to Maples)	3.90
South Branch, Cattaraugus Creek	4.0 (First bridge upstream 4 miles)	1.57
<b>CHAUTAUQUA COUNTY</b>		
Cattaraugus Creek	2.0 (Lower 2 miles)	None

S-14▲                      ▲S-15  
 ●C-13  
 ▲S-12  
 S-9▲ S-10▲ S-11  
 S-8● C-16● C-17●  
 ▲S-7●  
 S-6▲  
 C-5●  
 ●C-4● C-21●  
 ●C-3● C-22●  
 ●C-23●  
 ●C-24● C-25▲  
 ●C-26●  
 C-27● C-28●  
 C-2● C-29●  
 ▲S-1●  
 C-30● C-31● C-32●



● C-19 County Site      Other Area  
 ▲ S-25 State Site      Other Res

● C-19 County Site      Other Area  
 ▲ S-25 State Site      Other Res  
 ↑ Chesterfield State Forest Area  
 (Chesterfield Game Management Area)

		CAMPING	SWIMMING	FISHING	PICNICKING	BOATING	HUNTING
EVANGOLA	S-1	▲	▲	▲	▲	O	E
STURGEON POINT	C-2	U	N	D	E	P	D
ELLICOTT CREEK	C-3			V	E		
CANAL WEST	C-4			L			
OPPENHEIM	C-5			●			
WHIRLPOOL	S-6			●			
RESERVOIR	S-7			▲			
LEWISTON	S-8			▲			
LOWER NIAGARA	S-9	U	N	D	E	V	E
FORT NIAGARA	S-10			V	E	L	
4 MILE CREEK	S-11	▲	▲	▲	▲	▲	
WILSON TUSCARORA	S-12	U	N	D	E	V	E
KRULL - OLCOTT	C-13			E	L	O	P
GOLDEN HILL	S-14	U	N	D	E	V	E
LAKE SIDE BEACH	S-15	U	N	D	E	V	E
BOND LAKE	C-16	U	N	D	E	V	E
LOCKPORT	C-17	U	N	D	E	V	E
ROYALTON	C-18	U	N	D	E	V	E
NIAGARA COUNTY GOLF CLUB	C-19			E	L	O	P
TONAWANDA GMA	20			L		E	D
BEEMAN CREEK	C-21	U	N	D	E	V	E
AKRON FALLS	C-22			E	L	O	P
ISLE VIEW	C-23			E	L	O	P
COMO LAKE	C-24			E	L	O	P
DARIEN LAKES	S-25	▲	▲	▲	▲	▲	
ELMA MEADOWS	C-26			E	L	O	P
CHESTNUT RIDGE	C-27			E	L	O	P
EMERY	C-28			E	L	O	P
EIGHTEEN MILE CREEK	C-29	U	N	D	E	V	E
LARKIN	C-30	U	N	D	E	V	E
BOSTON	C-31	U	N	D	E	V	E
SPRAGUE	C-32			E	L	O	P

Buffalo Metropolitan Area • New York

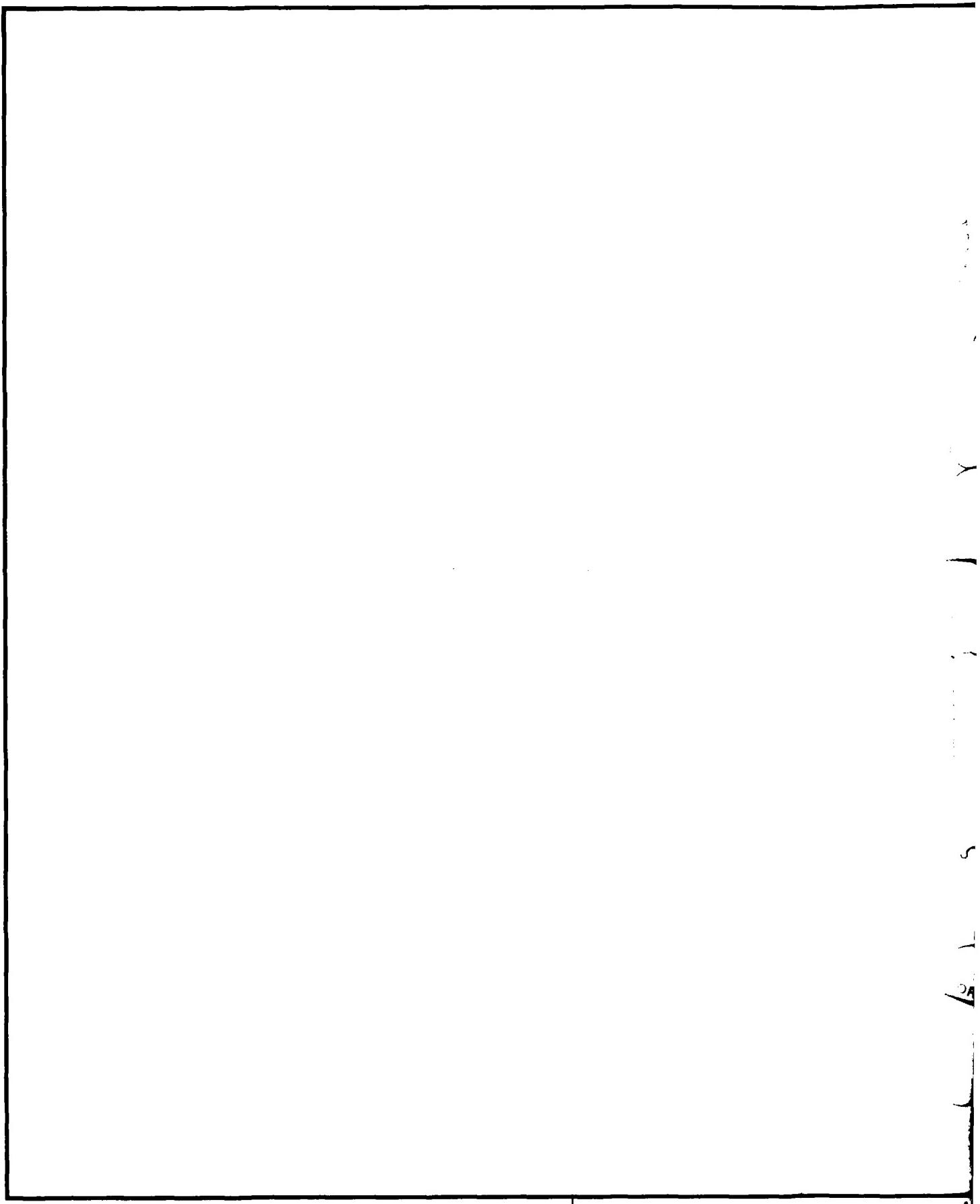
## PUBLIC RECREATION SITES

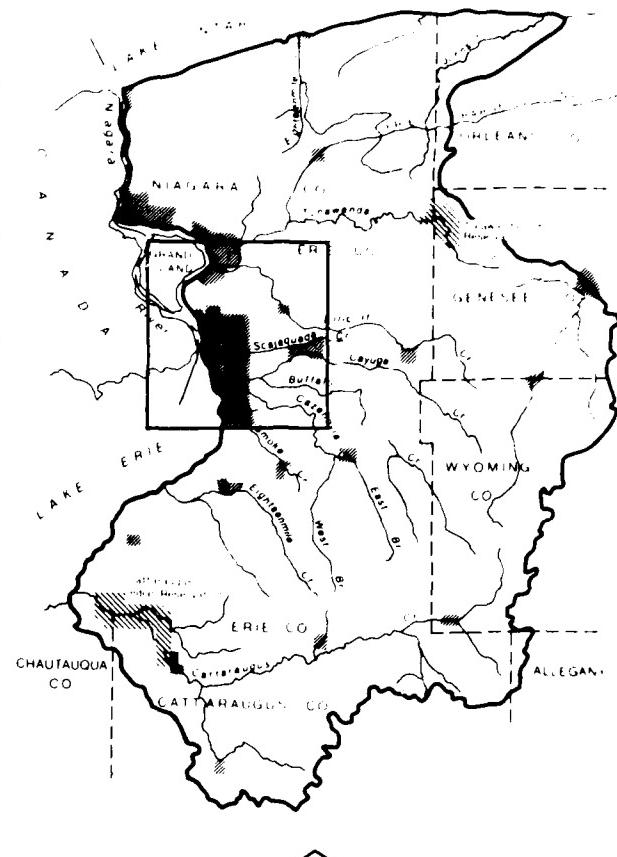
US Army • Corps of Engineers • Buffalo District

to accompany

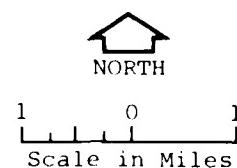
PRELIMINARY FEASIBILITY REPORT

1975



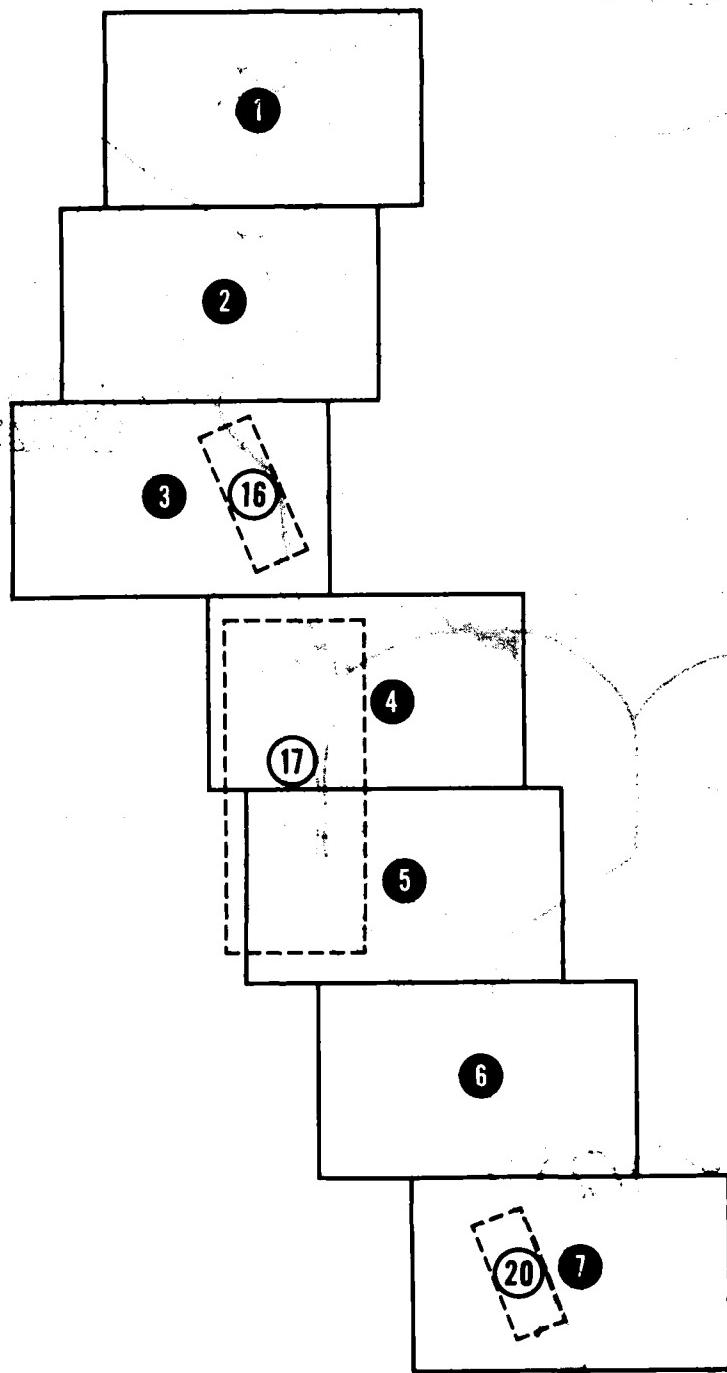


VICINITY MAP



Buffalo Metropolitan Area • New York  
**BUFFALO  
METROPOLITAN AREA WATERFRONT**

US Army • Corps of Engineers • Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975

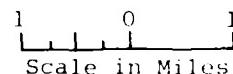


LEGEND

- (7) Waterfront Recreation and Access  
(PLATE 15, Sheets 1 through 7)
- (16) Riverside Park Area
- (17) Bird Island Pier Area
- (20) Small Boat Harbor Area
- (21) Cazenovia Creek Area
- (22) Cazenovia Creek Bicycle Path Area



NORTH

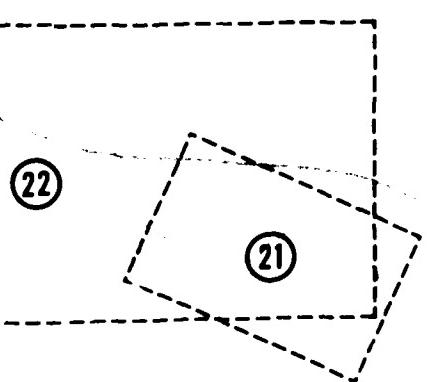


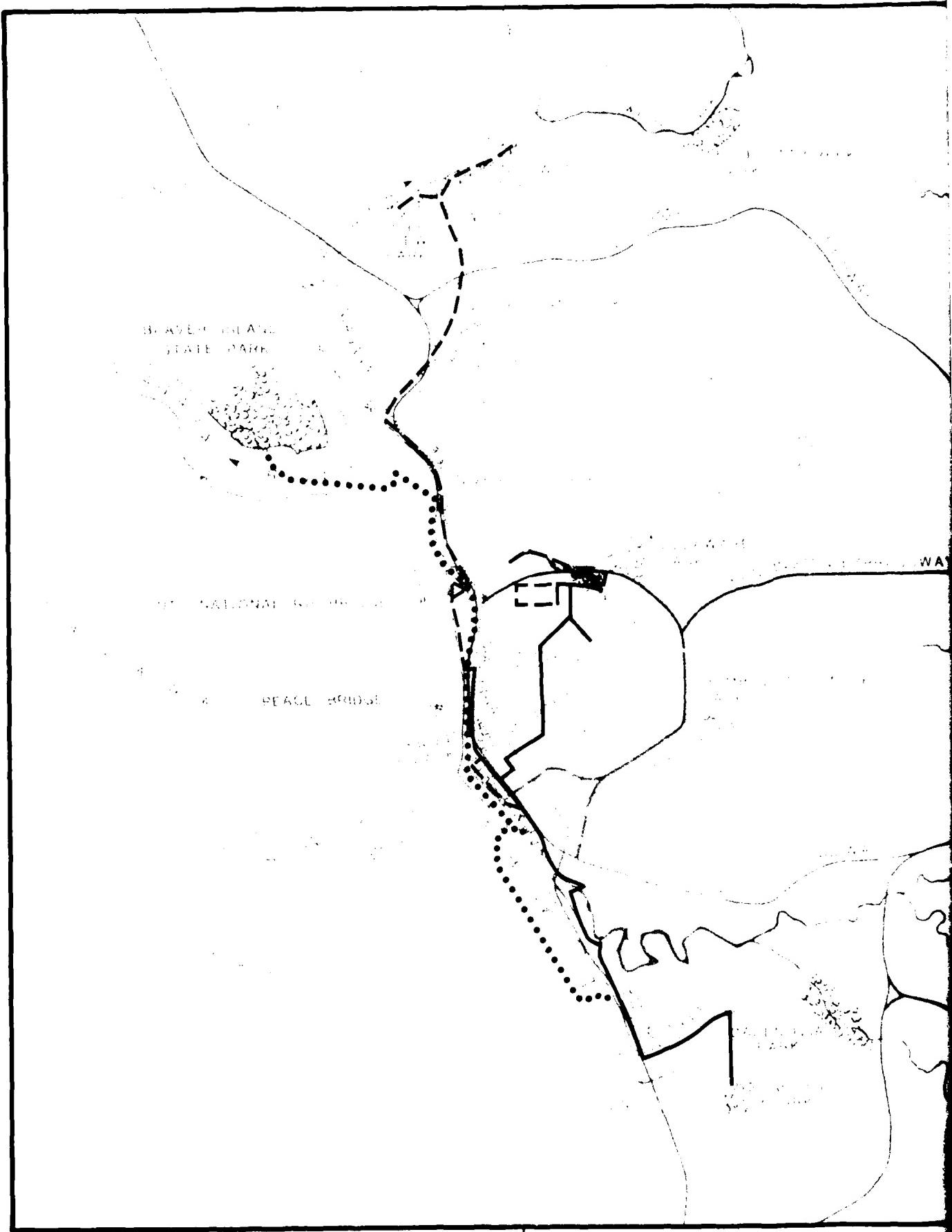
Scale in Miles

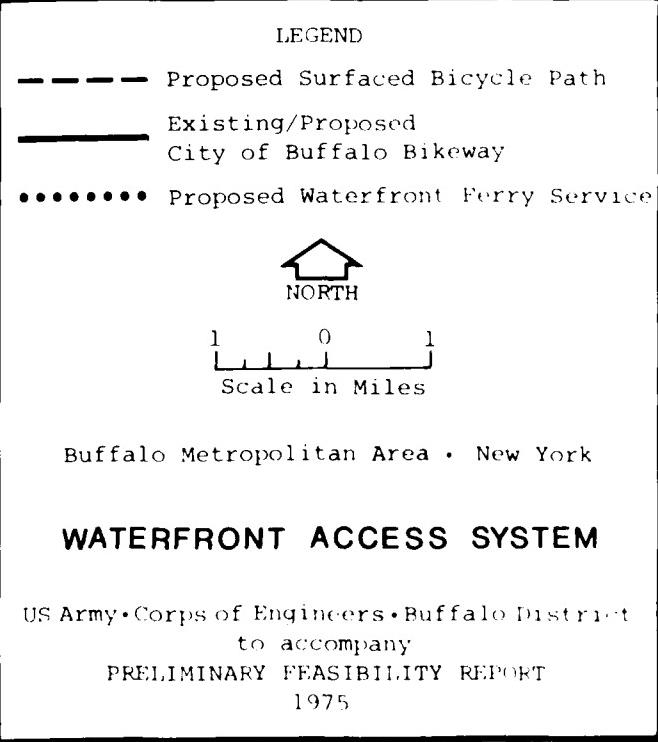
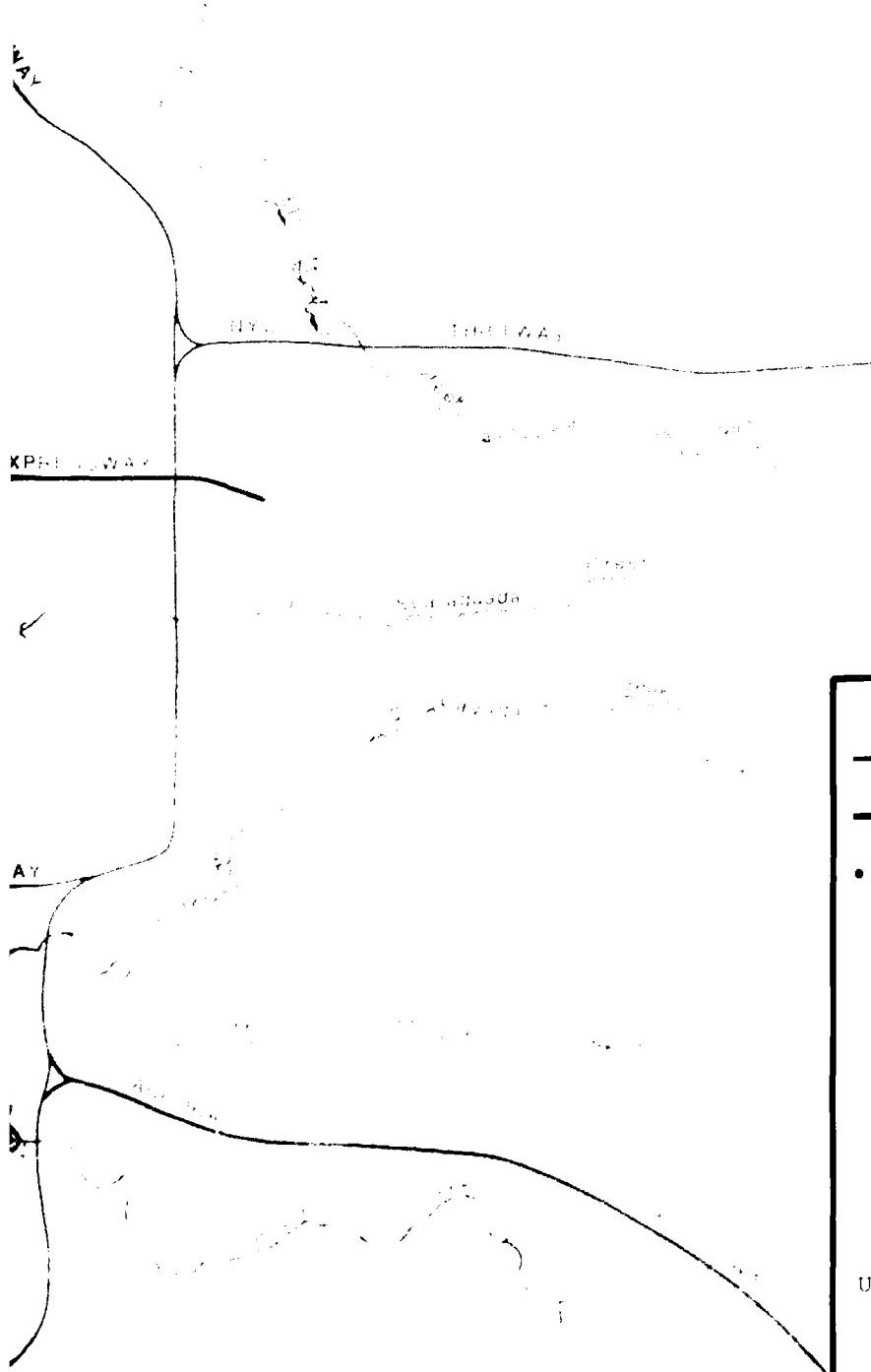
Buffalo Metropolitan Area • New York

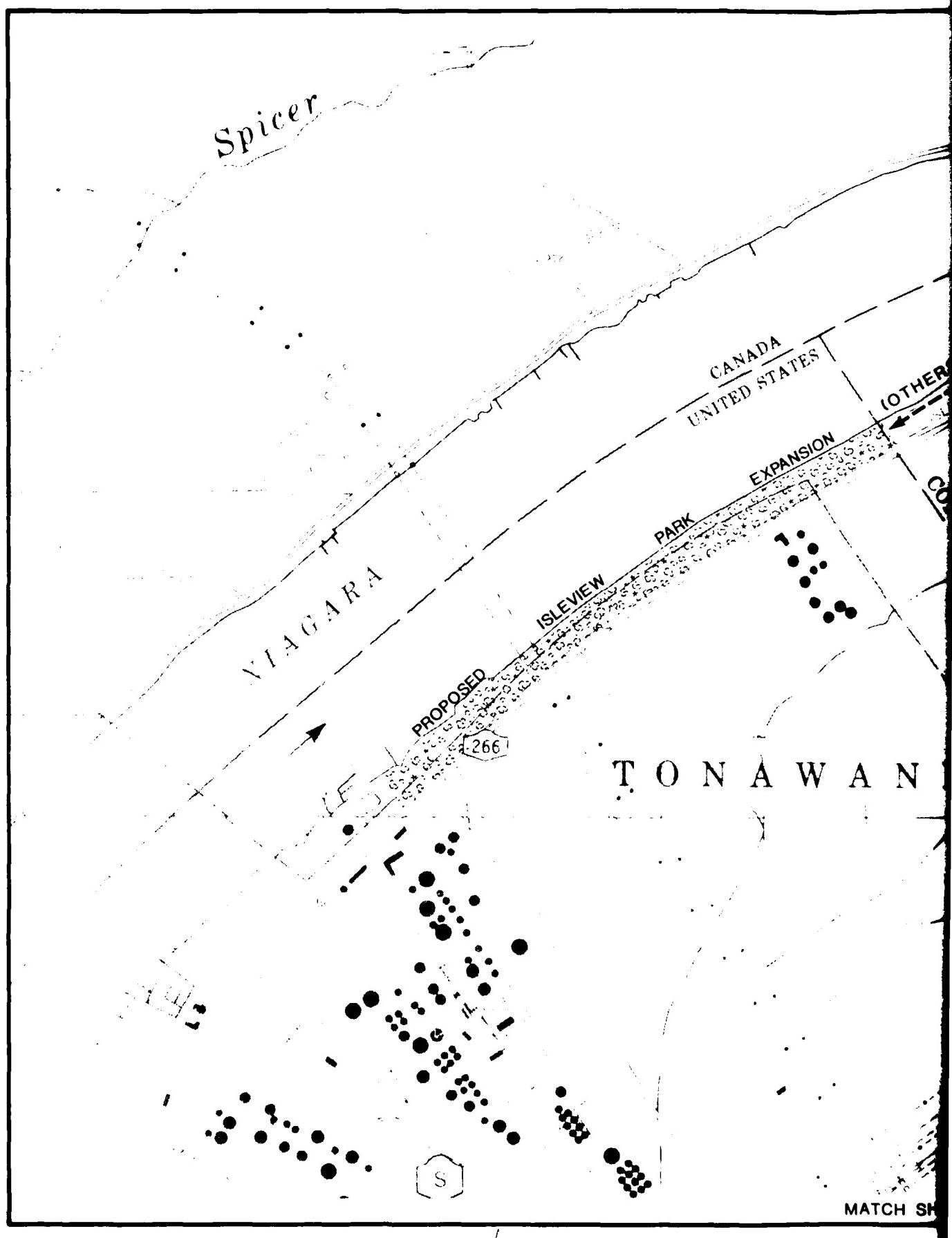
**WATERFRONT IMPROVEMENTS  
INDEX MAP**

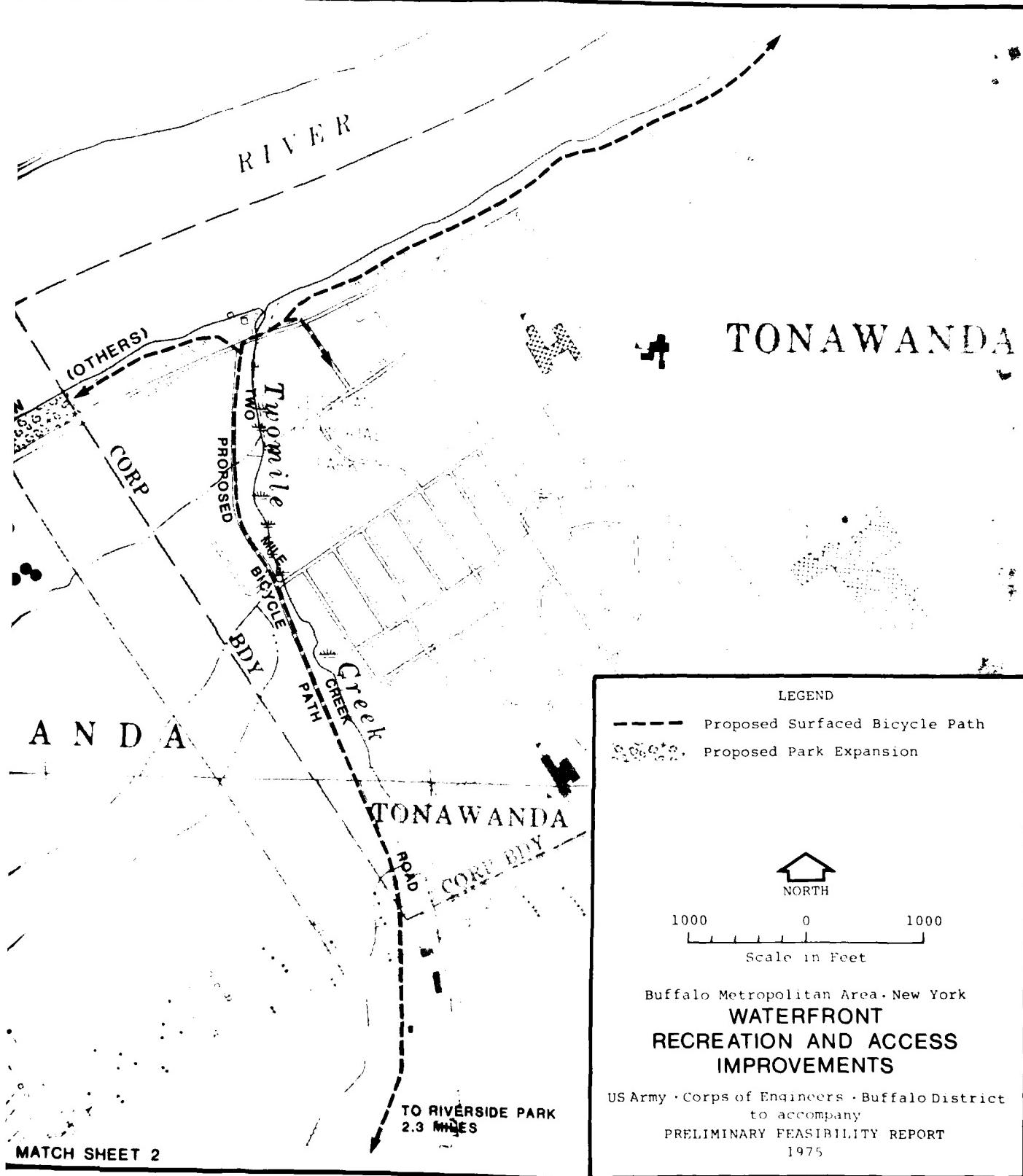
US Army • Corps of Engineers • Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975



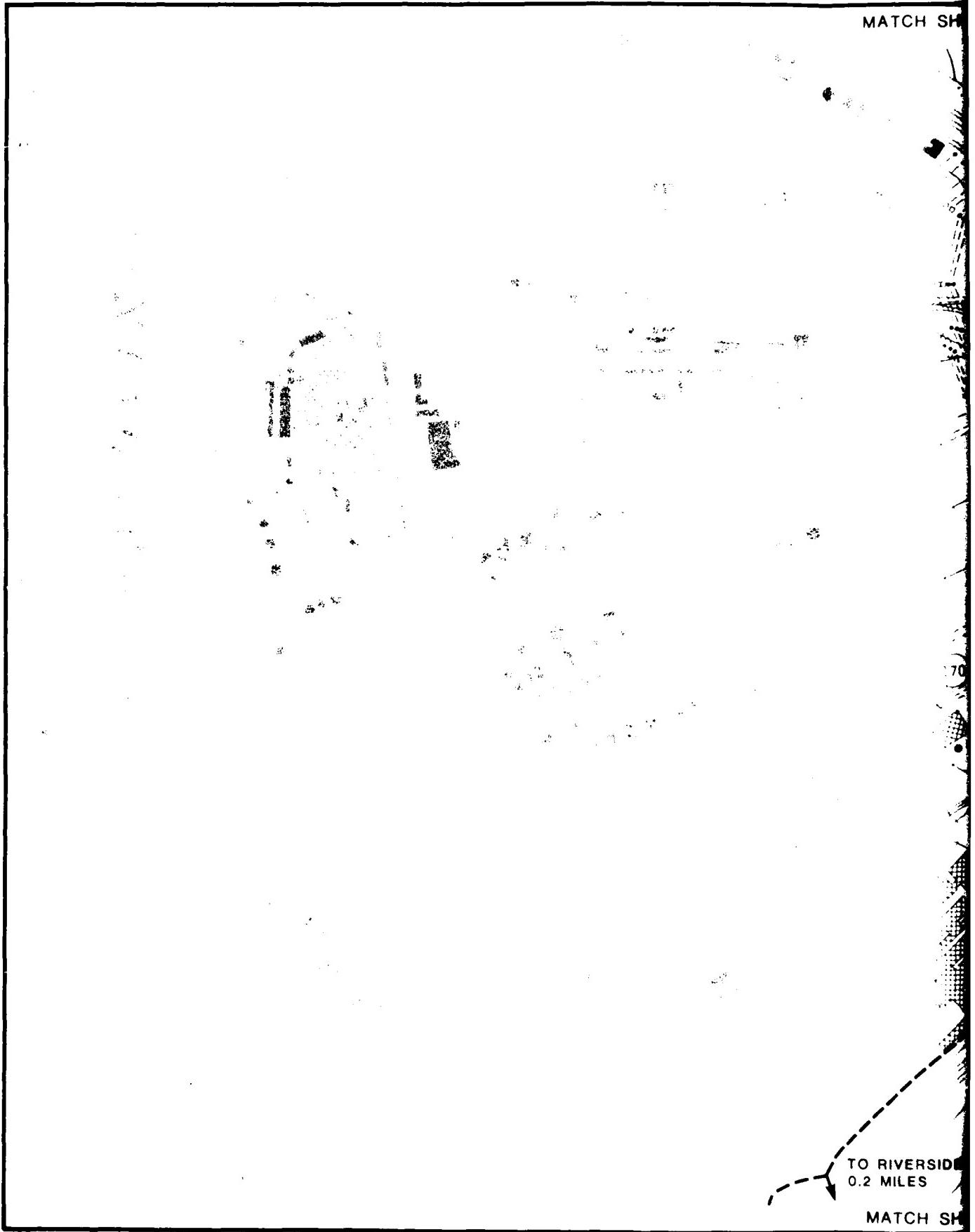








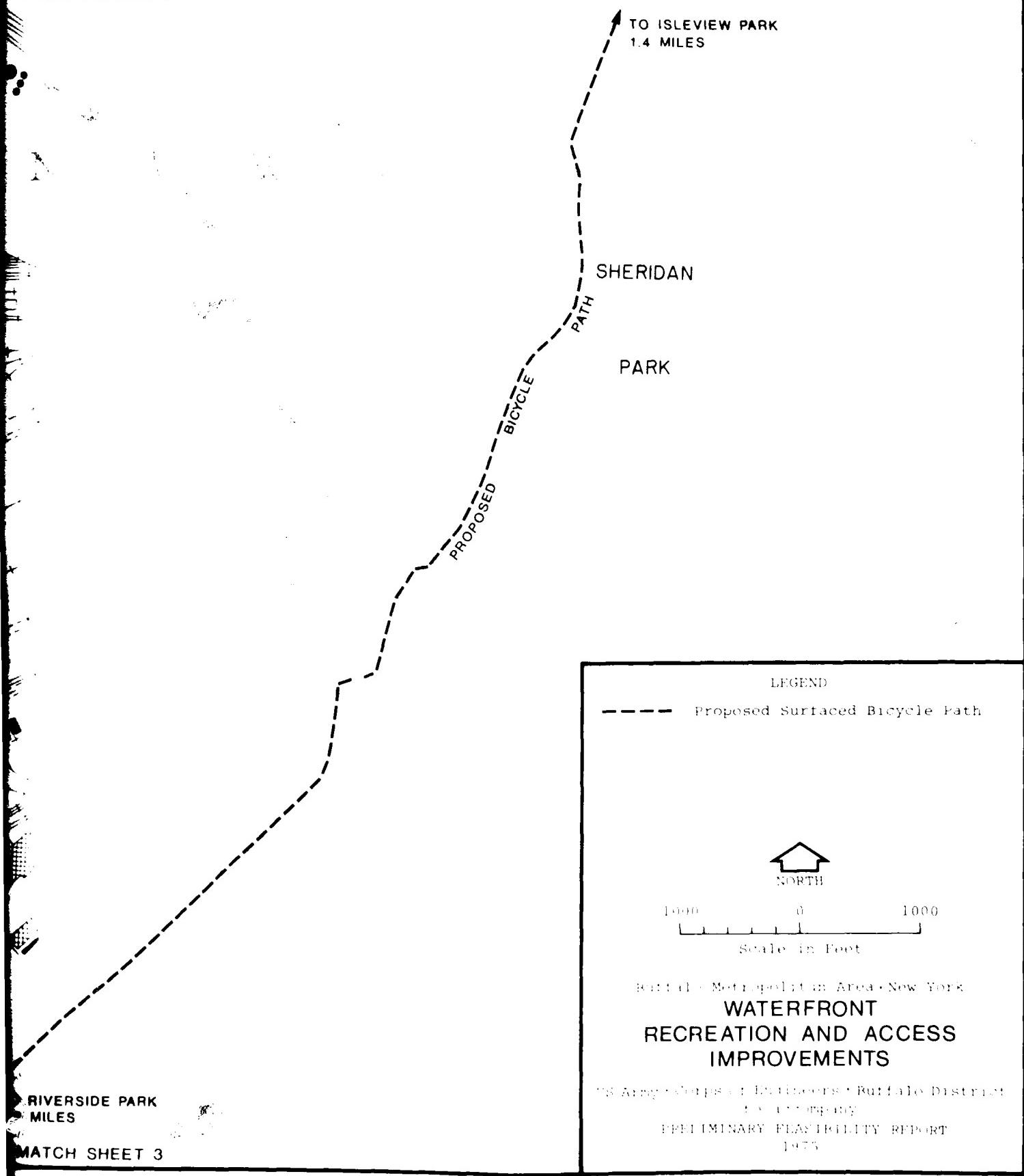
MATCH SH



TO RIVERSIDE  
0.2 MILES

MATCH SH

MATCH SHEET 1



MATCH SHEET 3

MATCH

BEAVER ISLAND  
STATE PARK  
MARINA

WATERFRONT FERRY SERVICE

LEGEND

- Proposed Surfaced Bicycle Path
- \*\*\*\*\* Proposed Bikeway City of Buffalo
- \*\*\*\*\* Proposed Waterfront Ferry Service



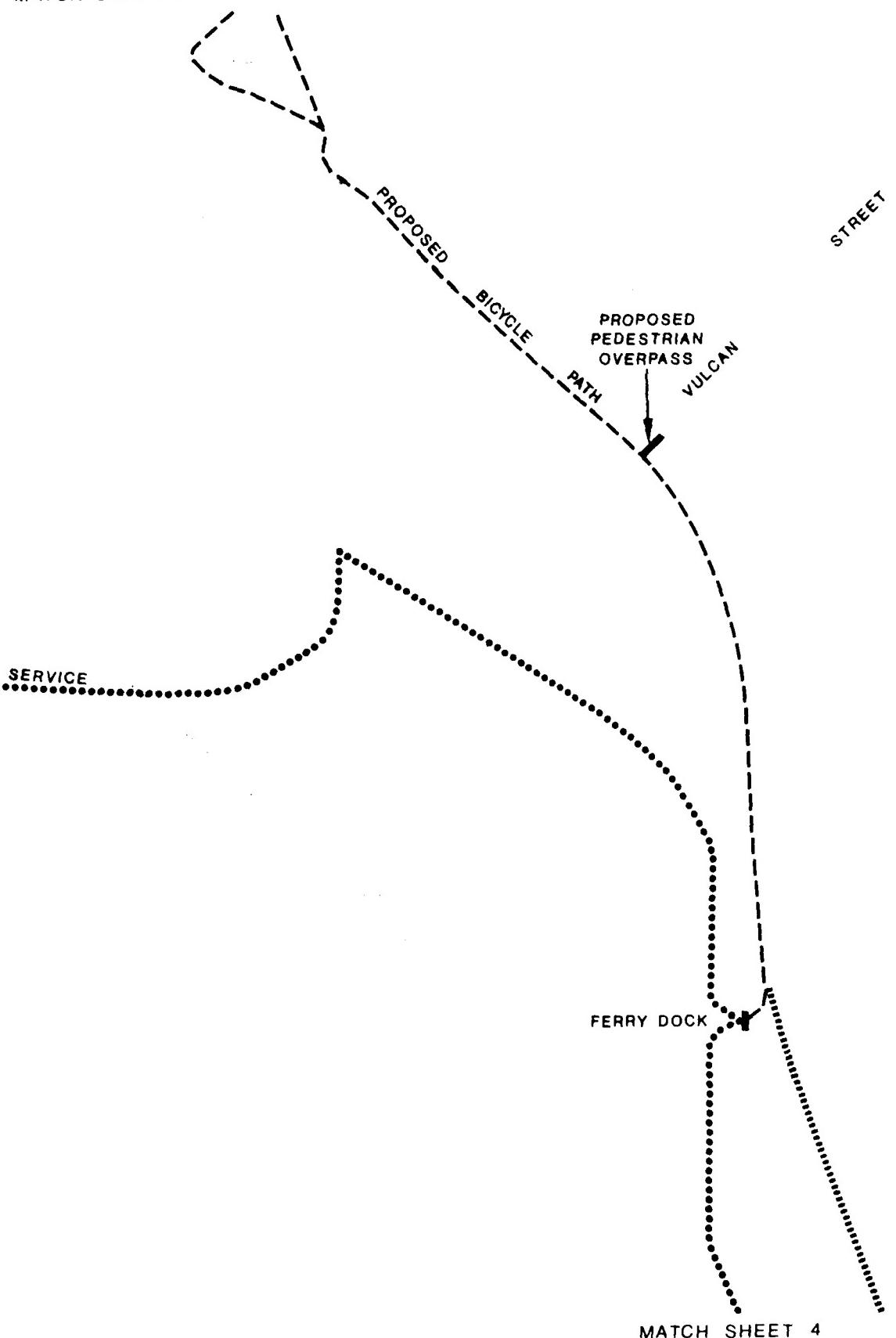
1000 0 1000  
Scale in Feet

Buffalo Metropolitan Area - New York

**WATERFRONT  
RECREATION AND ACCESS  
IMPROVEMENTS**

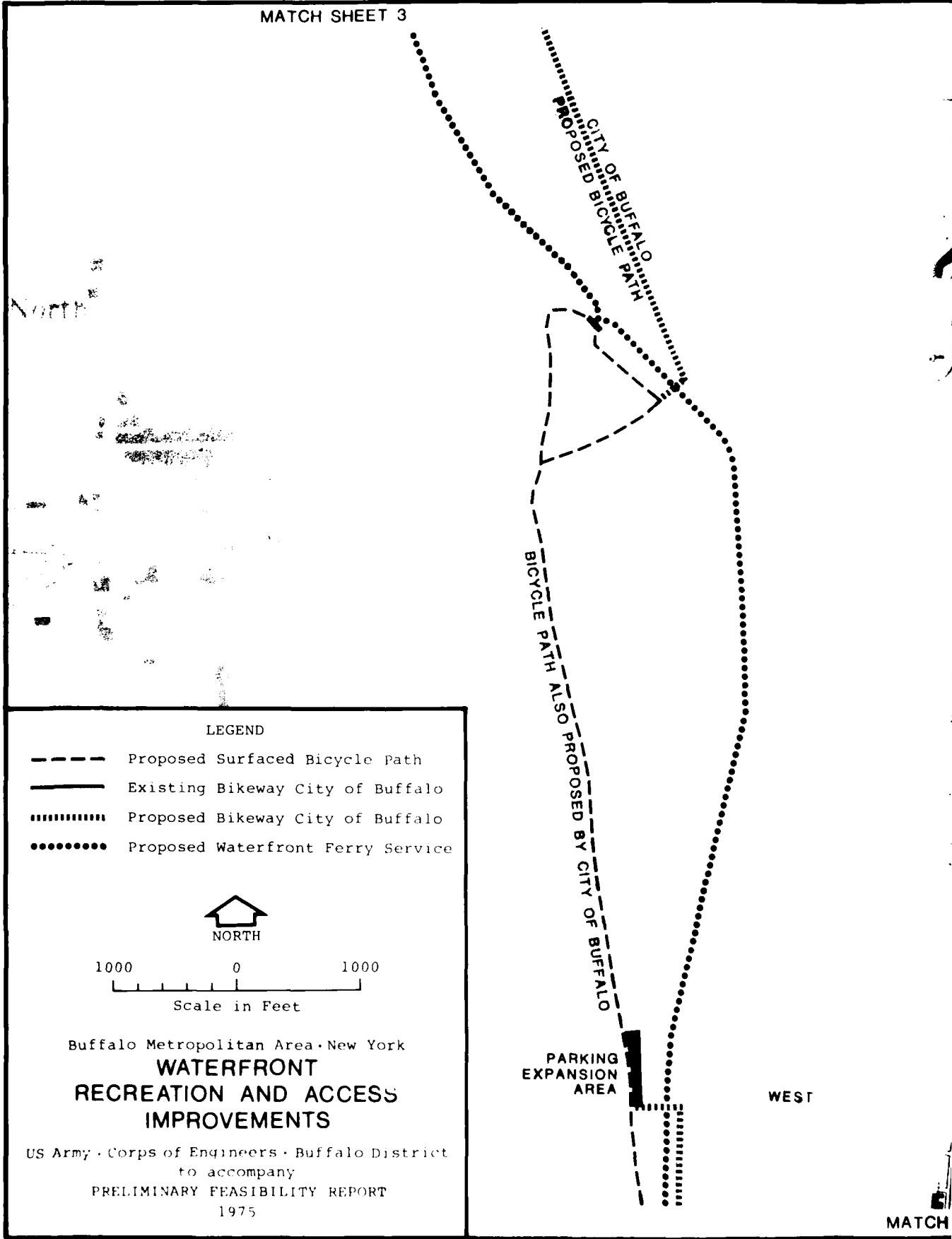
US Army - Corps of Engineers - Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975

MATCH SHEET 2

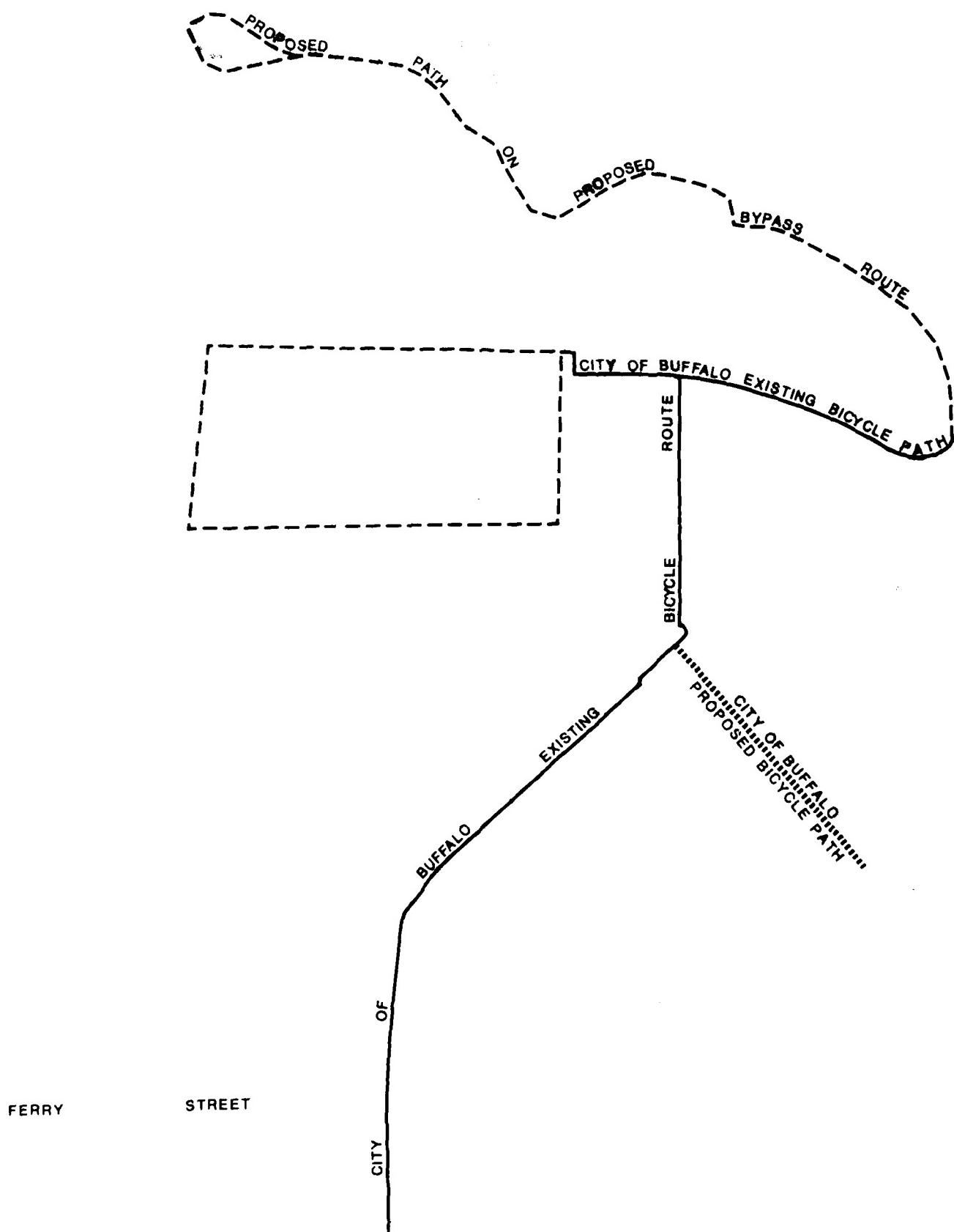


MATCH SHEET 4

MATCH SHEET 3

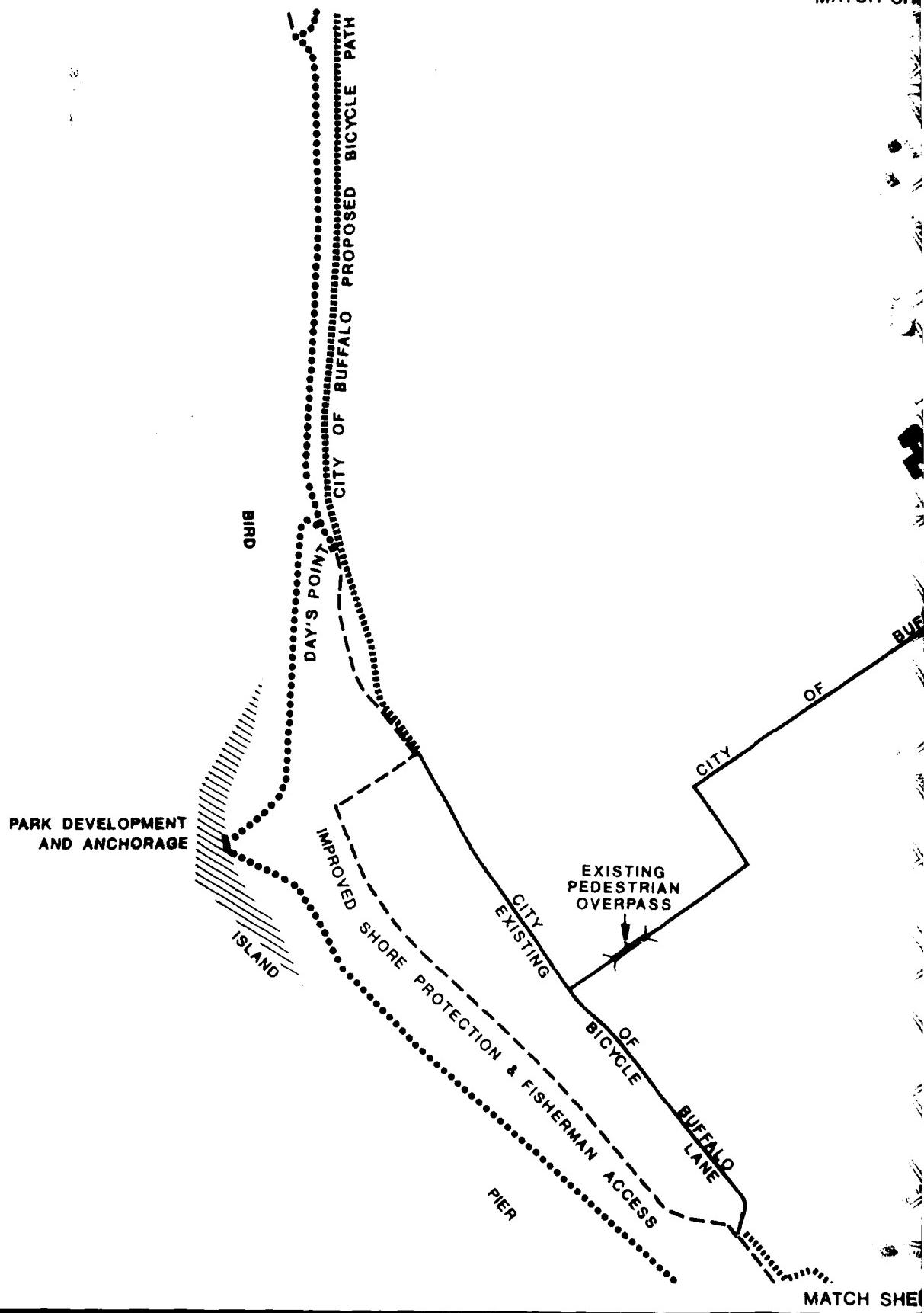


MATCH



MATCH SHEET 5

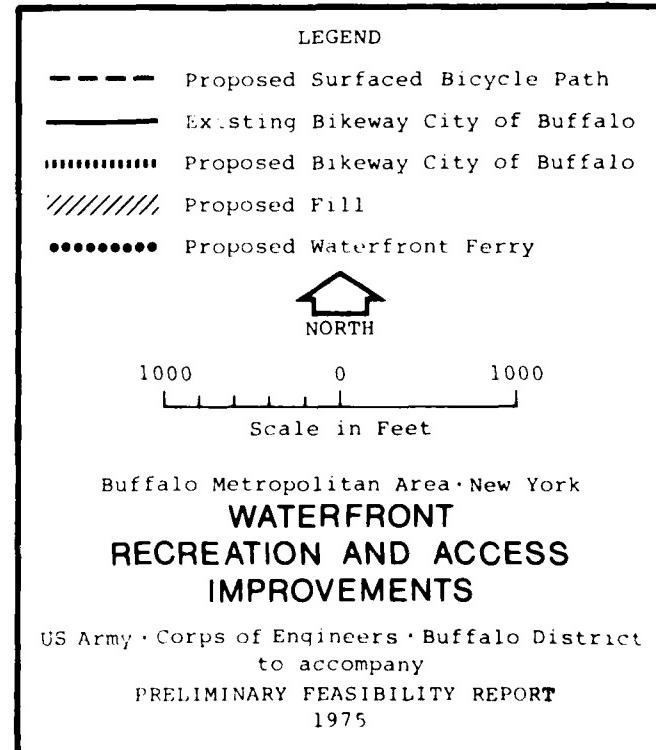
MATCH SH



MATCH SHEET 4

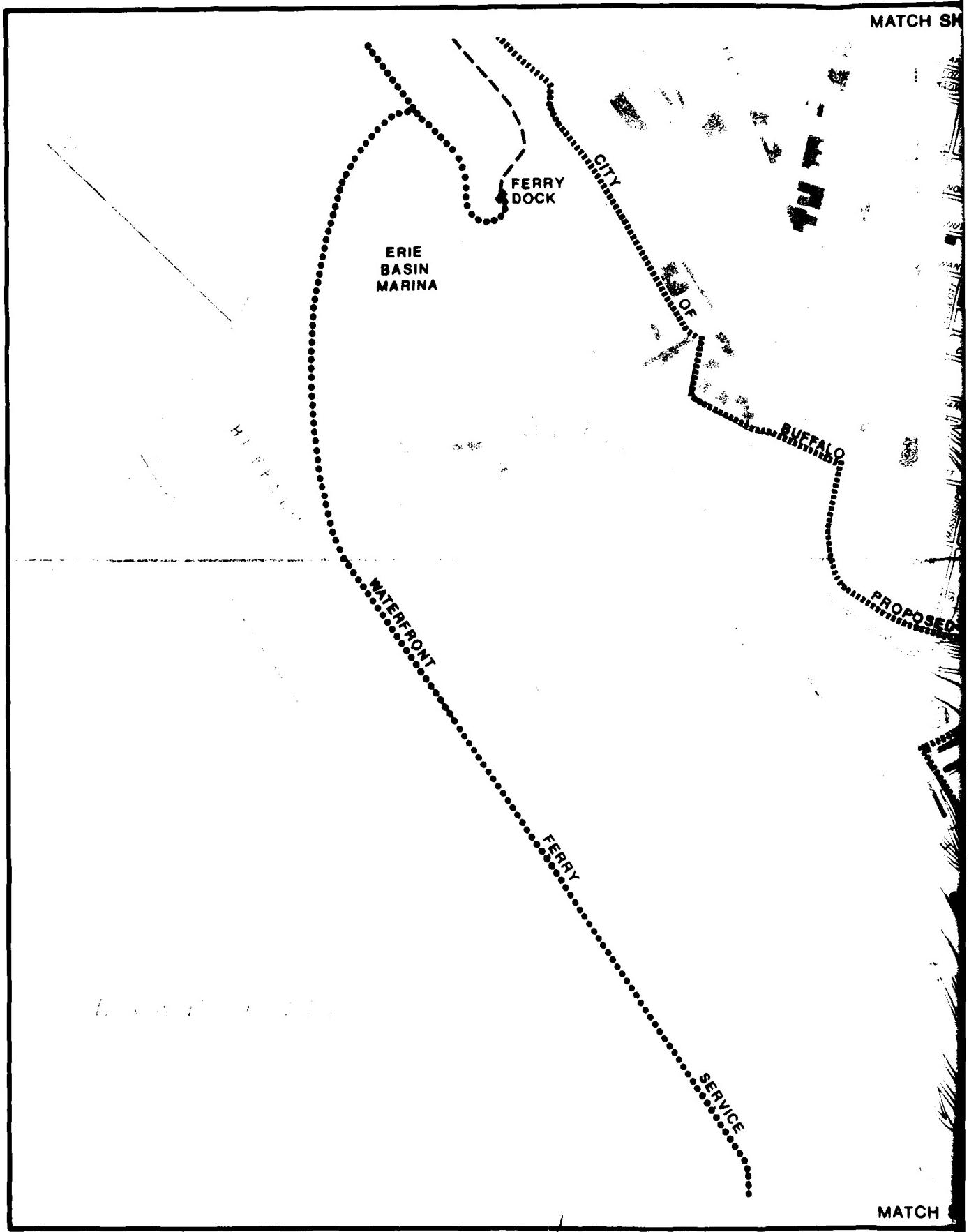
**EXISTING BICYCLE ROUTE**

**BUFFALO**



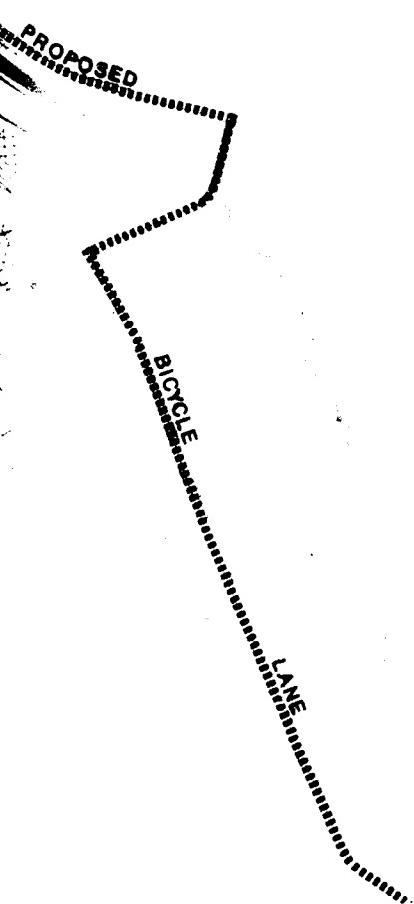
**MATCH SHEET 6**

MATCH SH



MATCH

MATCH SHEET 5



LEGEND  
- - - - Proposed Surfaced Bicycle Path  
- - - - - Proposed Bikeway City of Buffalo  
- - - - - - Proposed Waterfront Ferry Service



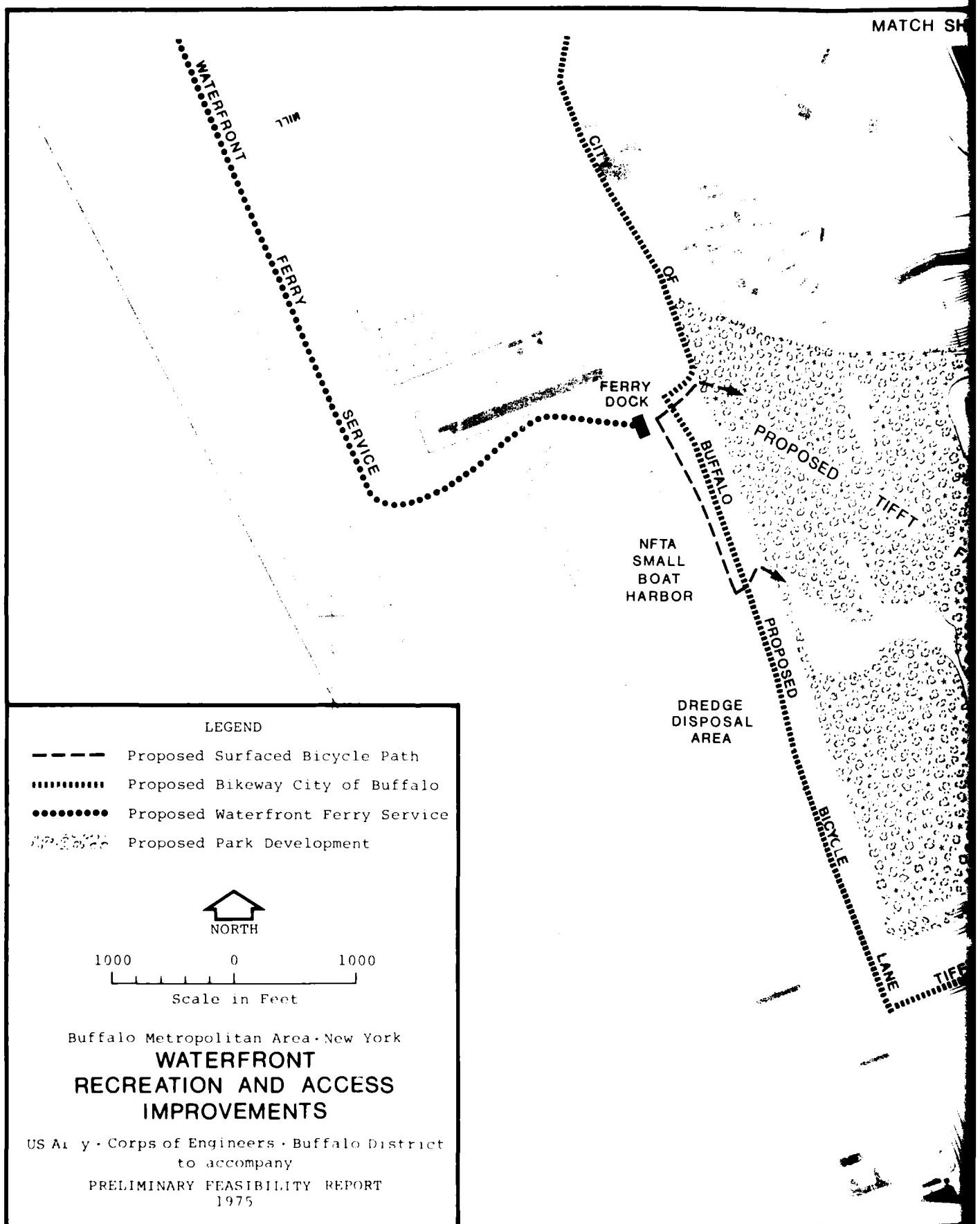
1000 0 1000  
Scale in Feet

Buffalo Metropolitan Area - New York  
**WATERFRONT  
RECREATION AND ACCESS  
IMPROVEMENTS**

US Army - Corps of Engineers - Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975

MATCH SHEET 7

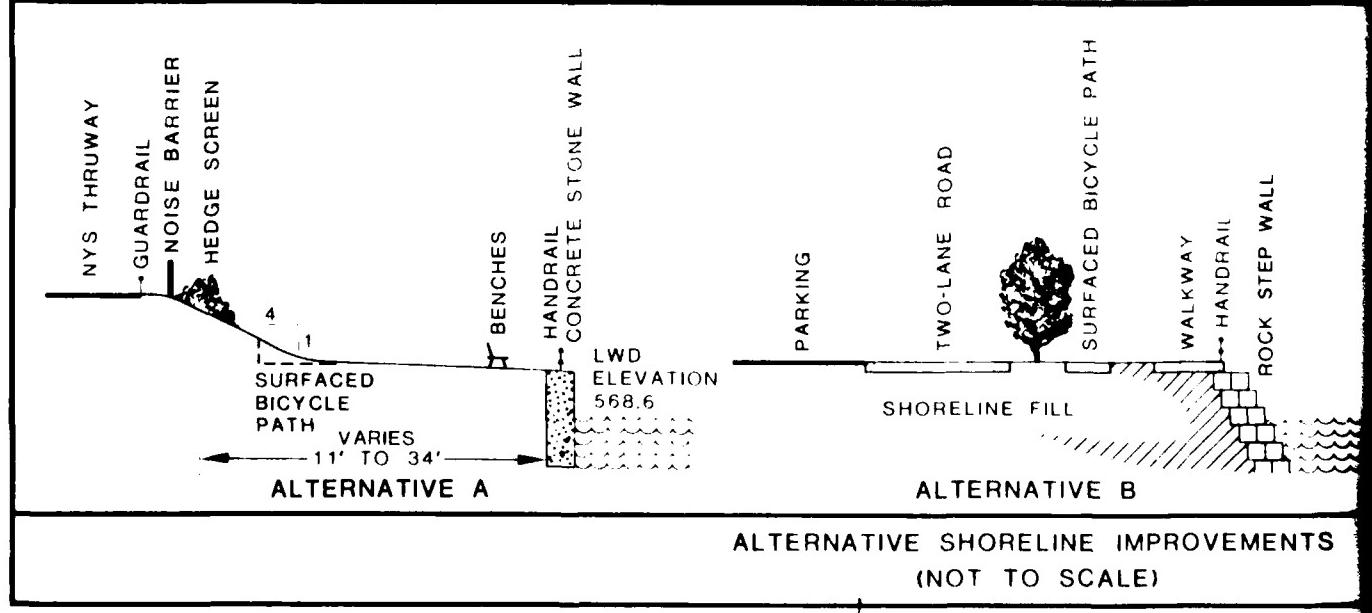
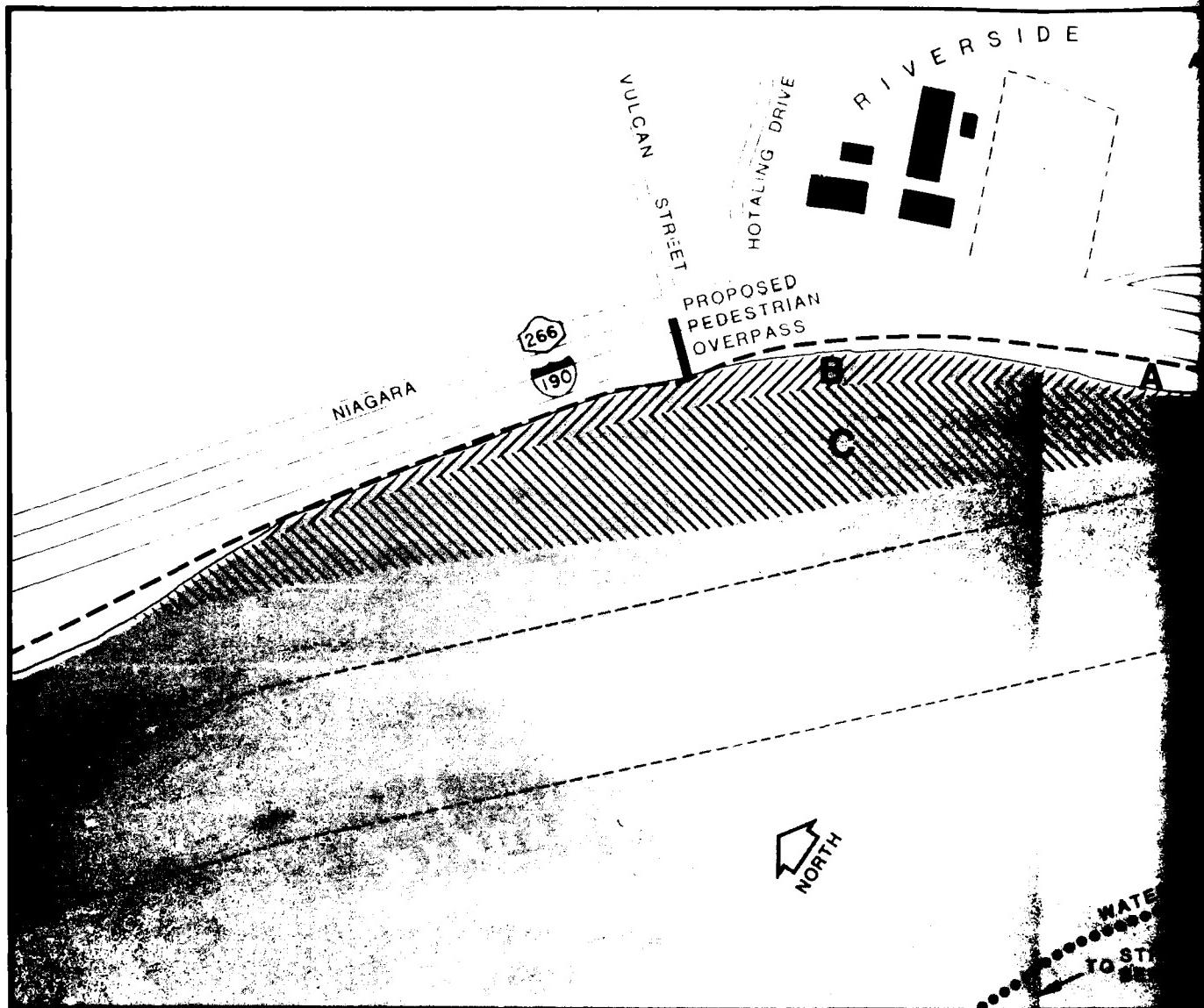
MATCH SH

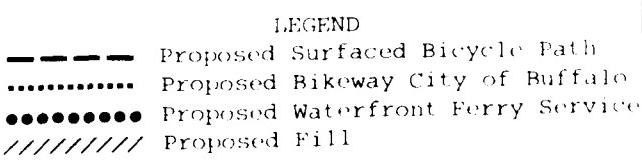
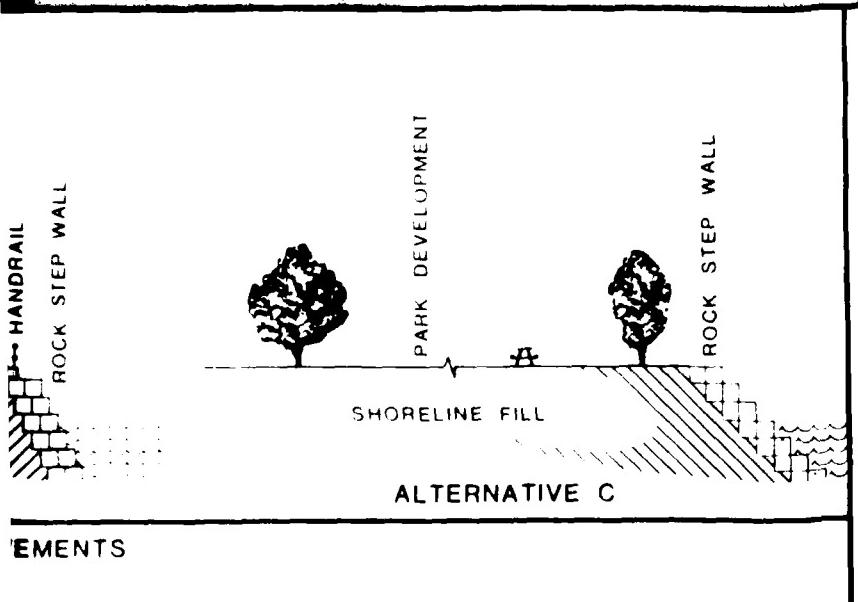
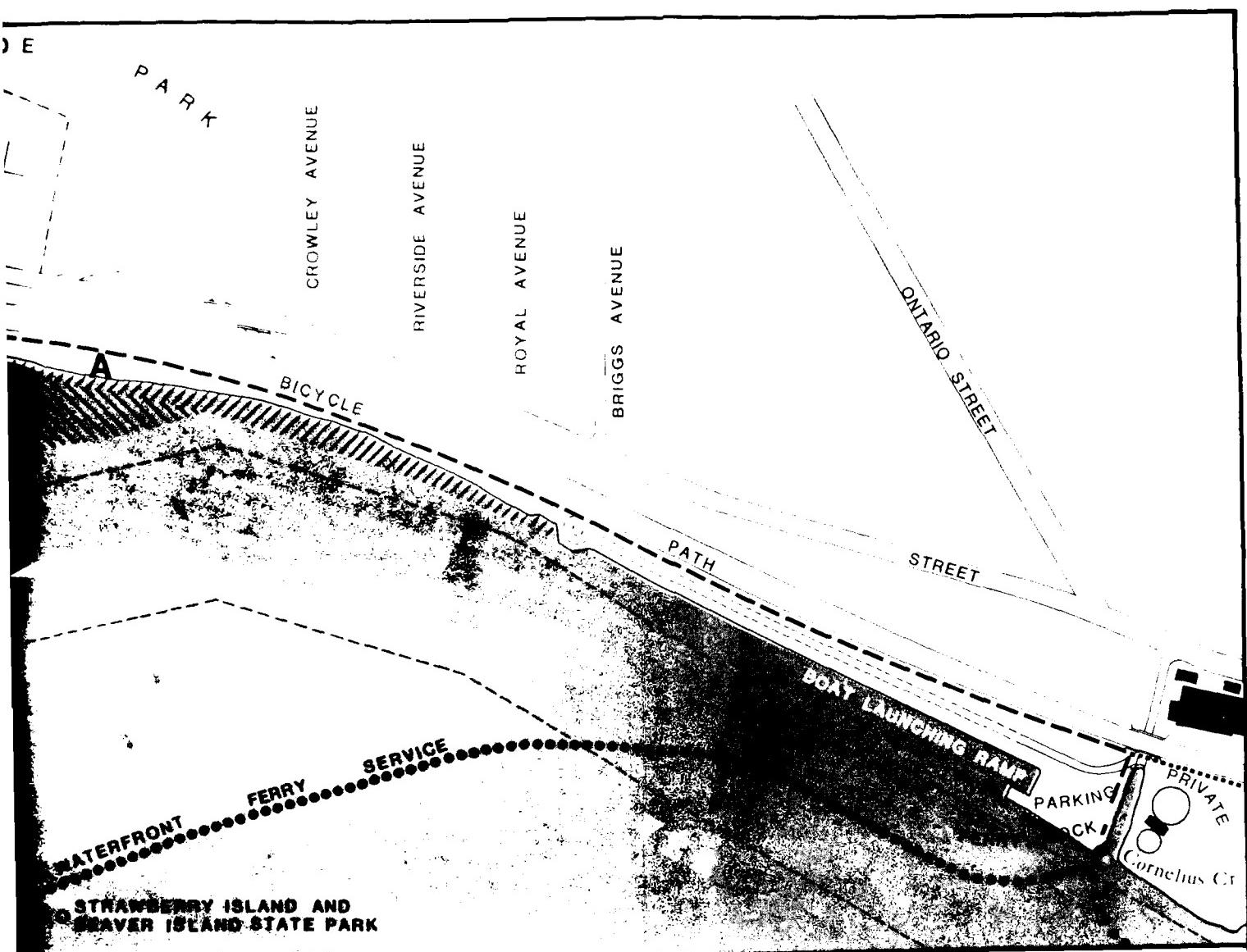


MATCH SHEET 6

TIFFT FARM NATURE PRESERVE  
TANNE TANNE TANNE TANNE TANNE

STREET

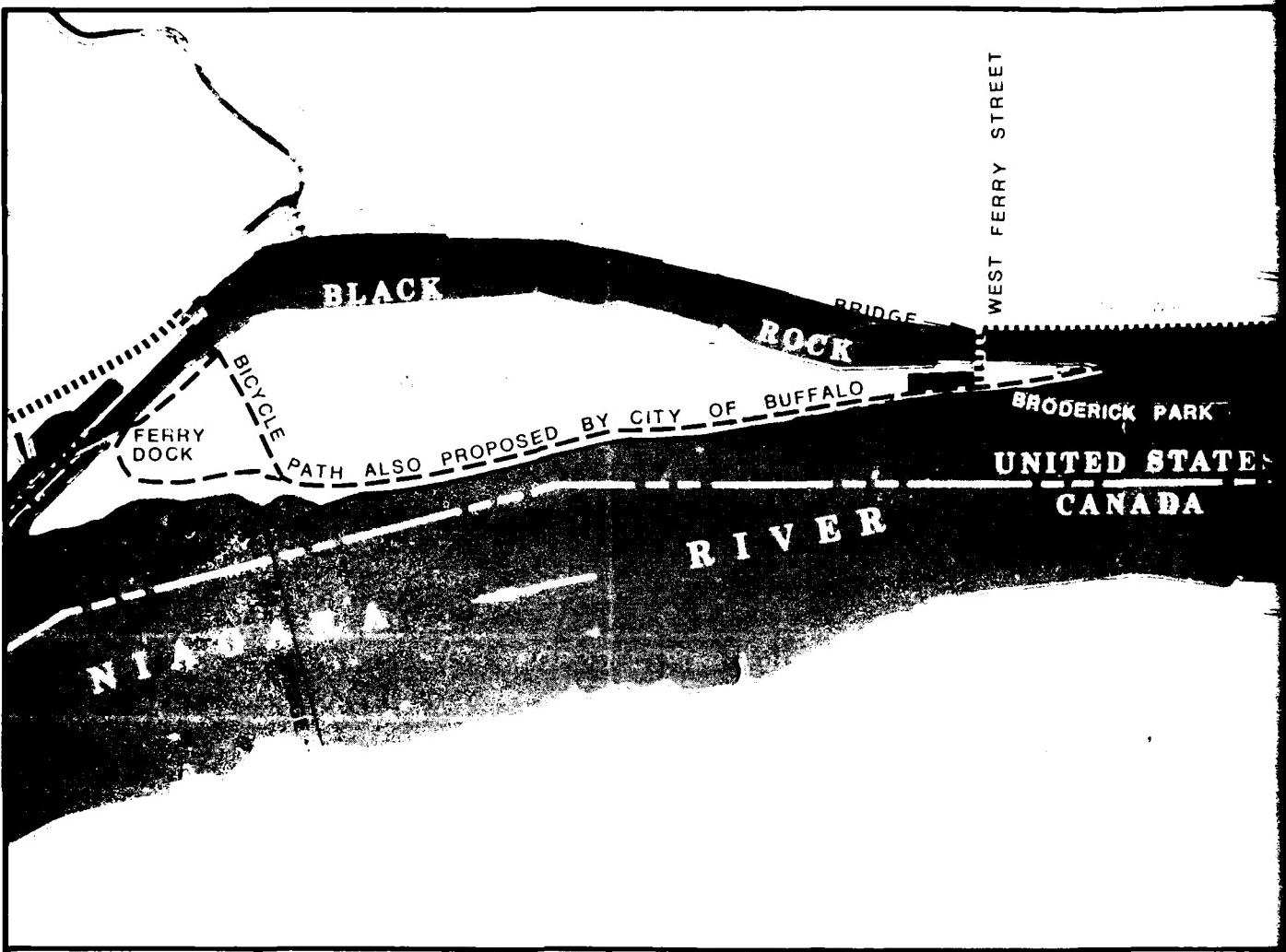




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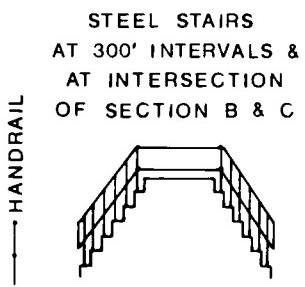
# RIVERSIDE PARK AREA RECREATION AND ACCESS IMPROVEMENTS

US Army Corps of Engineers, Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975



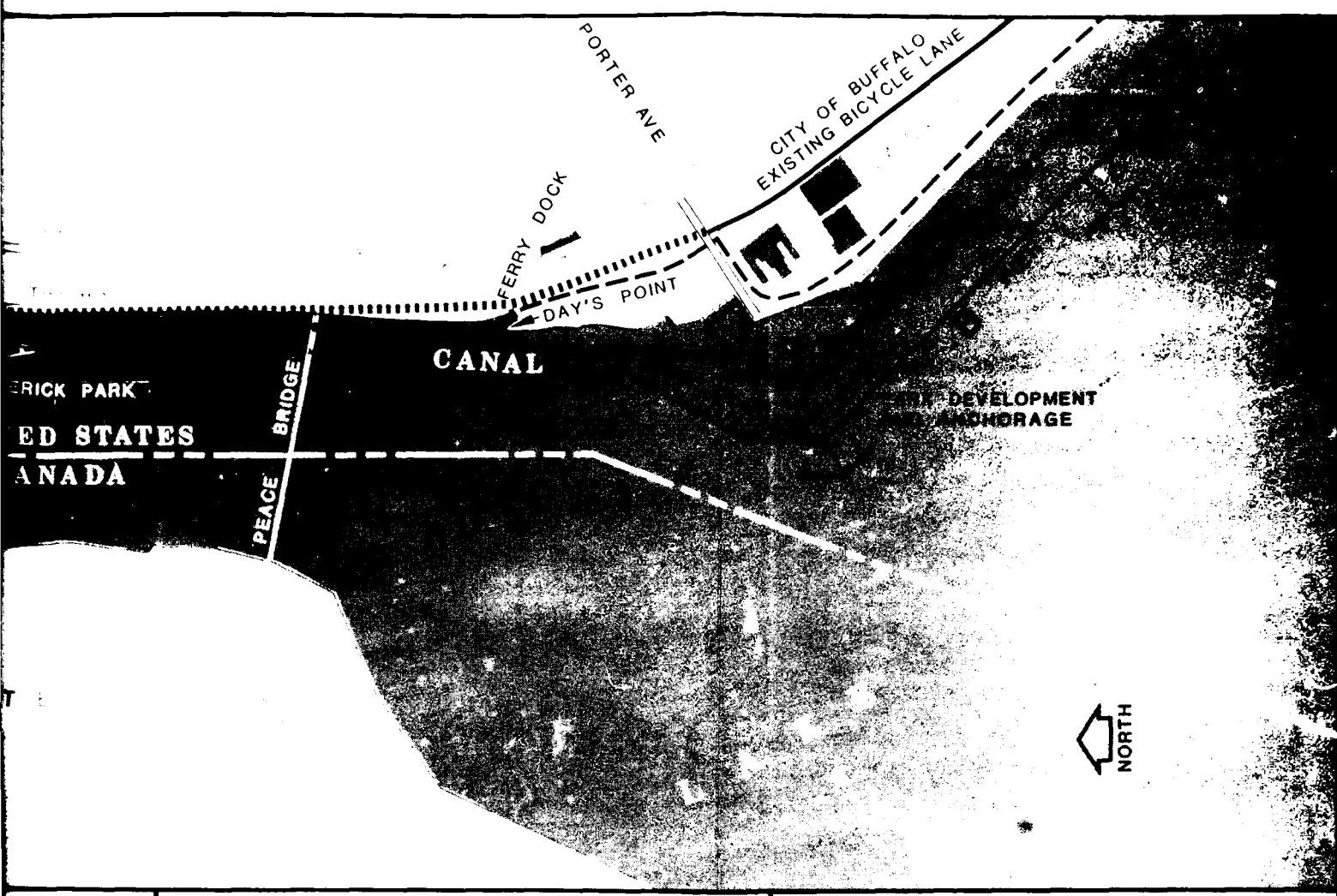
APPROXIMATE LENGTH OF  
IMPROVEMENT: 6600'

SECTION A



SECTION B

PROPOSED PIER REHABILITATION TYPICAL CROSS-SE  
(NOT TO SCALE)



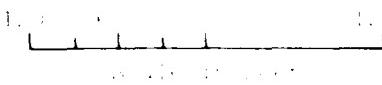
## HANDRAIL

— HANDBAIL

### SECTION C

## CROSS - SECTIONS

- Proposed Internet Library Path  
----- Existing Pathway to Buffalo  
\*\*\*\*\* Proposed Bufferway to Buffalo  
\*\*\*\*\* Proposed Waterfront Library Service  
||||| Proposed Library

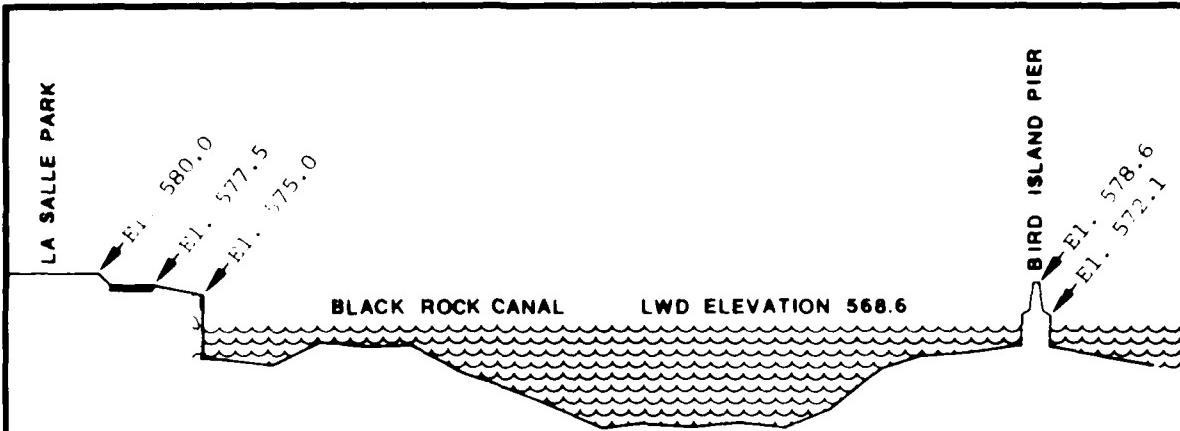


Battell Library, University of Connecticut, Storrs, Connecticut

BIRD ISLAND PIER  
RECREATION AND ACCESS  
IMPROVEMENTS

W. A. MASTERS / JOURNAL OF CLIMATE

1990-1991 学年第一学期期中考试



#### LA SALLE PARK AREA

CROSS SECTION LOOKING UPSTREAM

Vertical Scale: 1" = 40'

Horizontal Scale: 1" = 150'

#### LAKE ERIE WATER SURFACE ELEVATIONS

##### Calendar

Year	Mean	Maximum	Minimum
1972	571.92	574.66	569.90
1971	571.32	572.97	569.93
1970	571.11	573.14	569.74
1969	571.59	573.38	570.03
1968	571.01	573.99	569.22
1967	570.54	572.32	569.06
1966	570.04	572.49	568.27
1965	569.41	572.16	566.29
1964	569.06	570.90	566.66
1963	569.44	571.05	568.09
Ten Year Means	570.54	572.70	568.71

1/ Statistics from "Water Resources Data for New York,  
Part I, Surface Water Records", U.S. Geological Survey

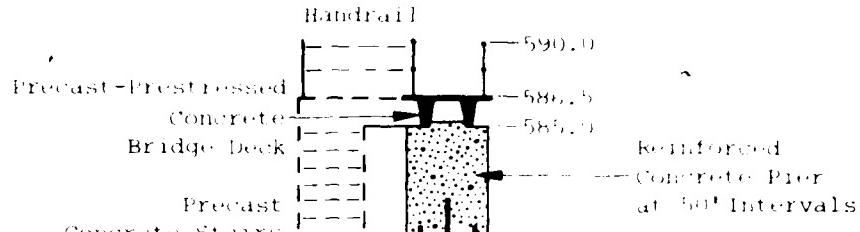
Buffalo Metropolitan Area - New York

#### ELEVATIONS OF LA SALLE PARK AREA LAKE ERIE WATER SURFACE

US Army - Corps of Engineers - Buffalo District  
for accompany

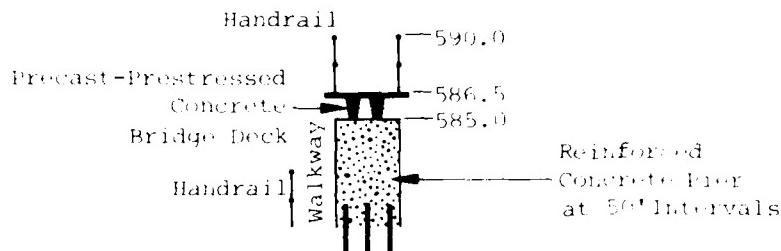
PRELIMINARY FEASIBILITY REPORT  
1975

**NOT TO SCALE**



Approximate Length of Improvement: 3100'

**SECTION B**



Approximate Length of Improvement: 800'

**SECTION C**

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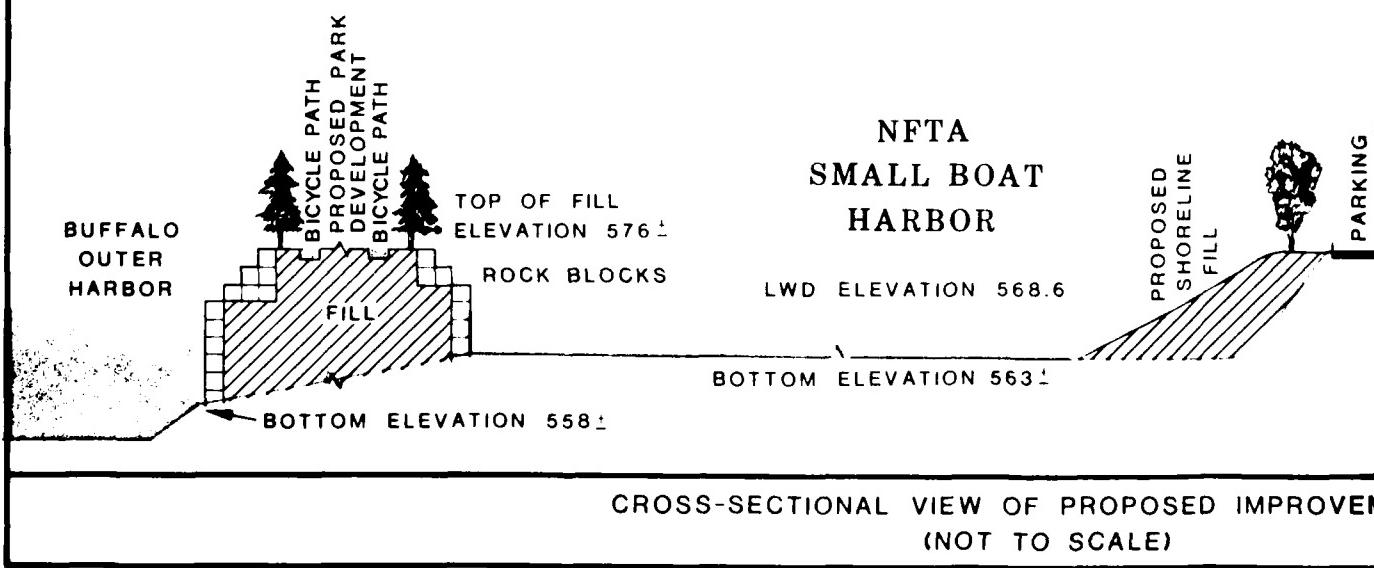
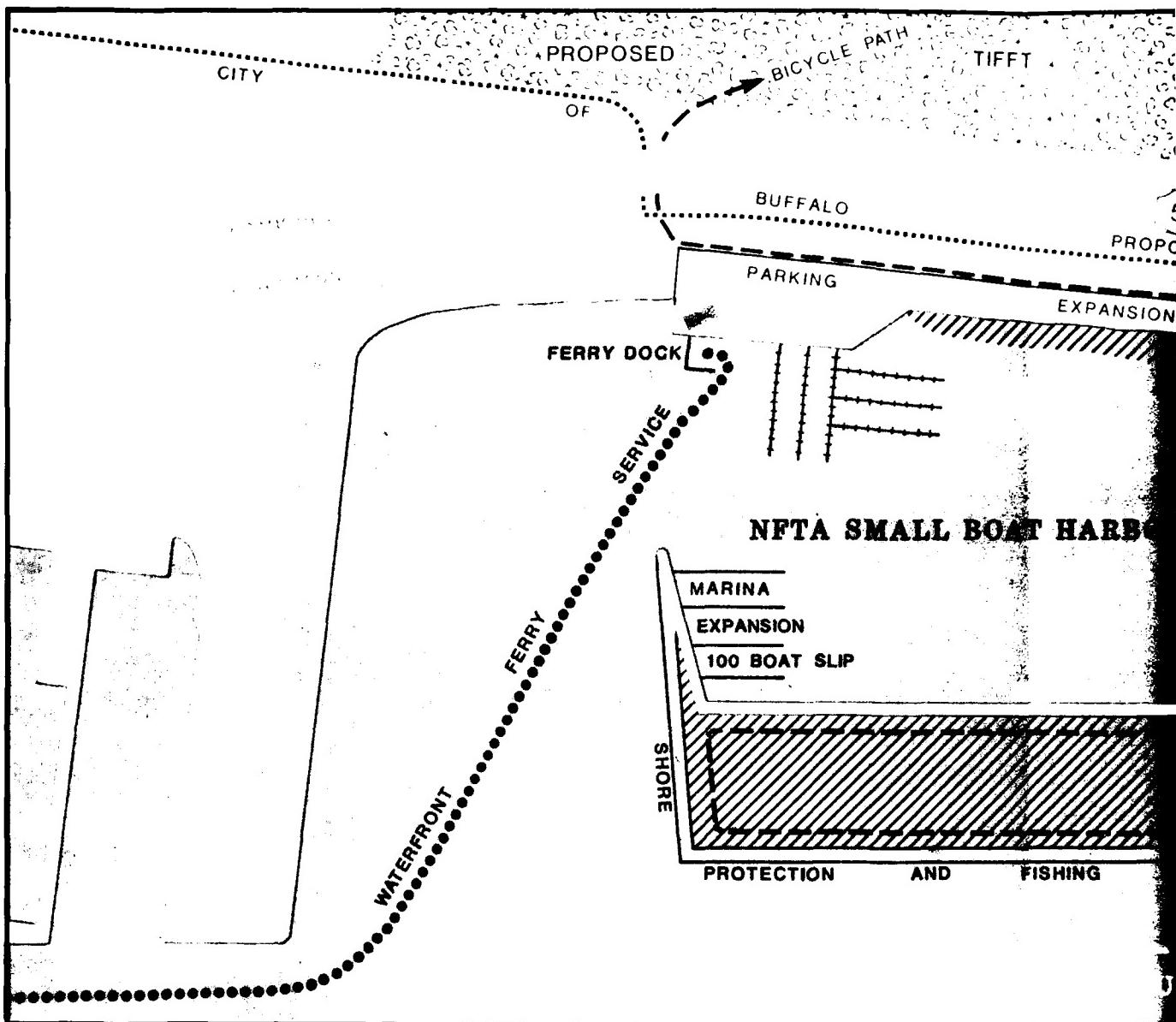
**ALTERNATIVE  
PIER REHABILITATION  
TYPICAL CROSS-SECTIONS**

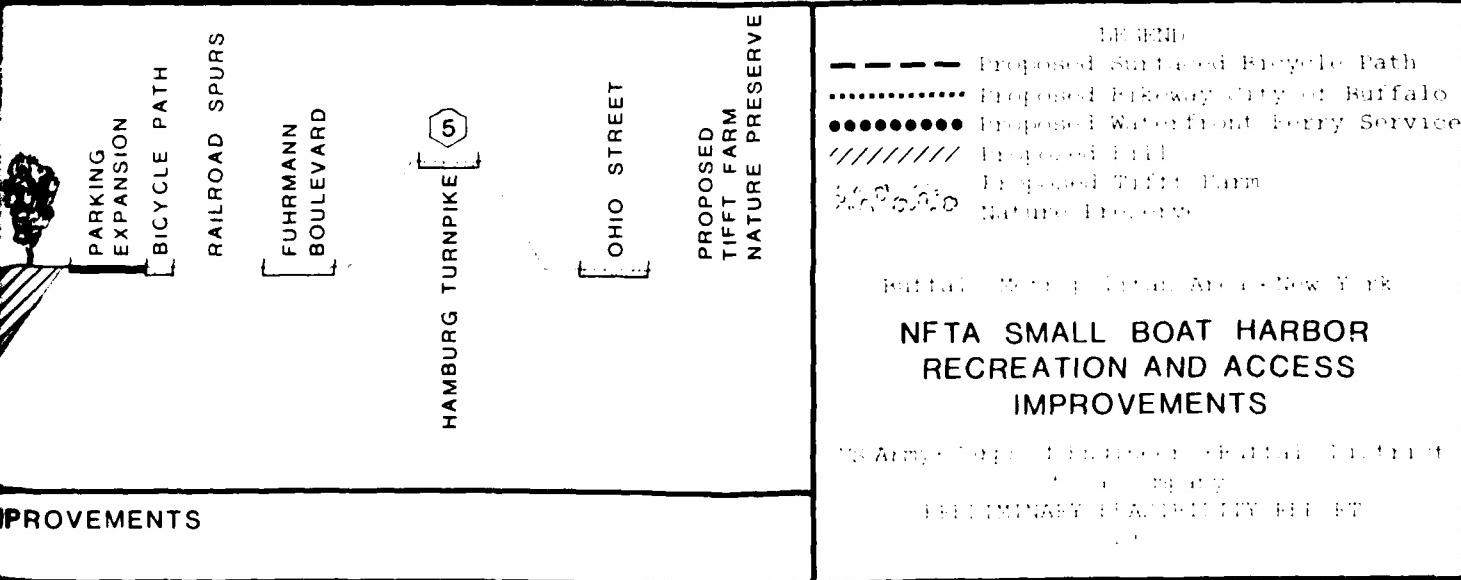
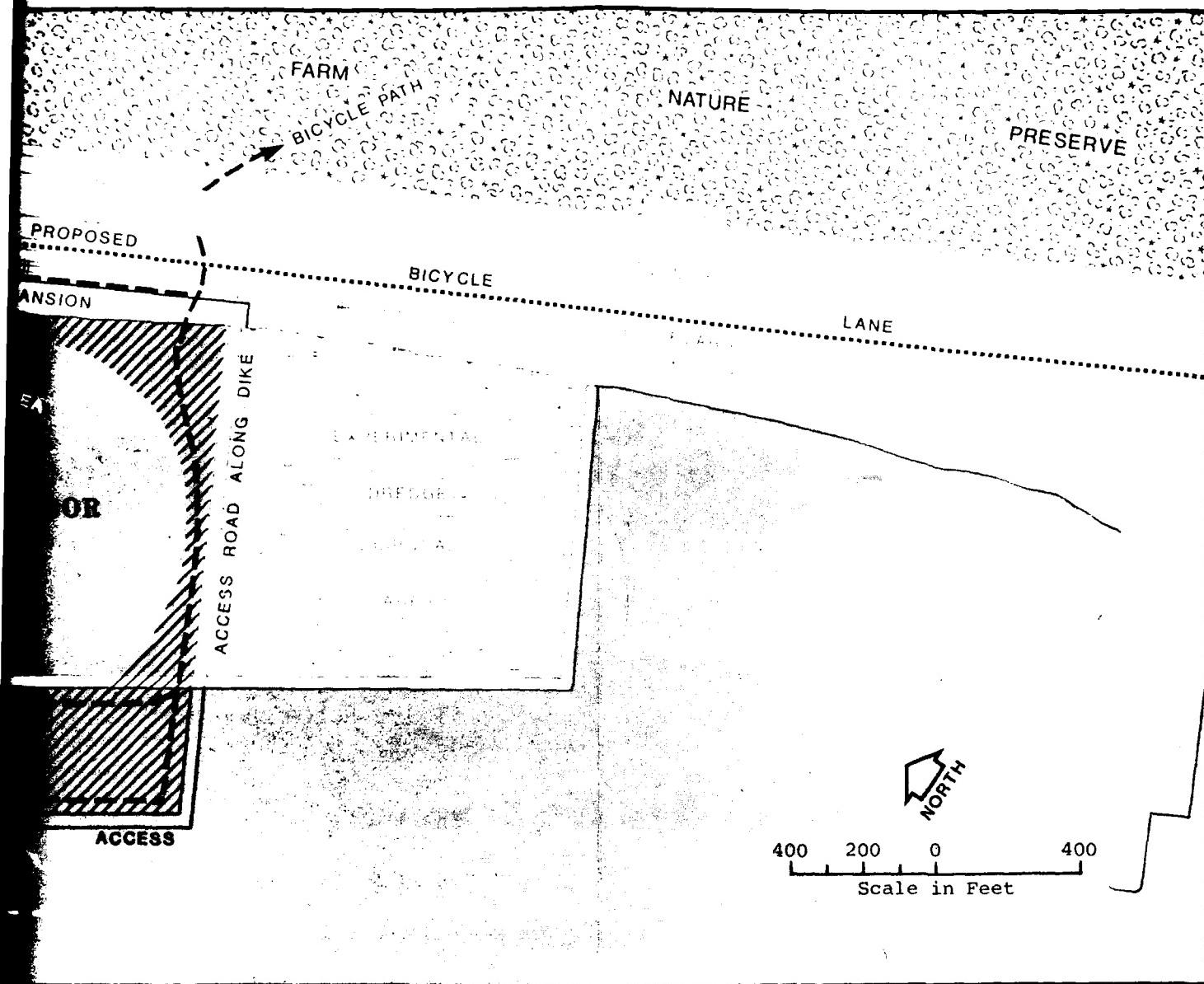
U.S. Army Corps of Engineers, Buffalo District

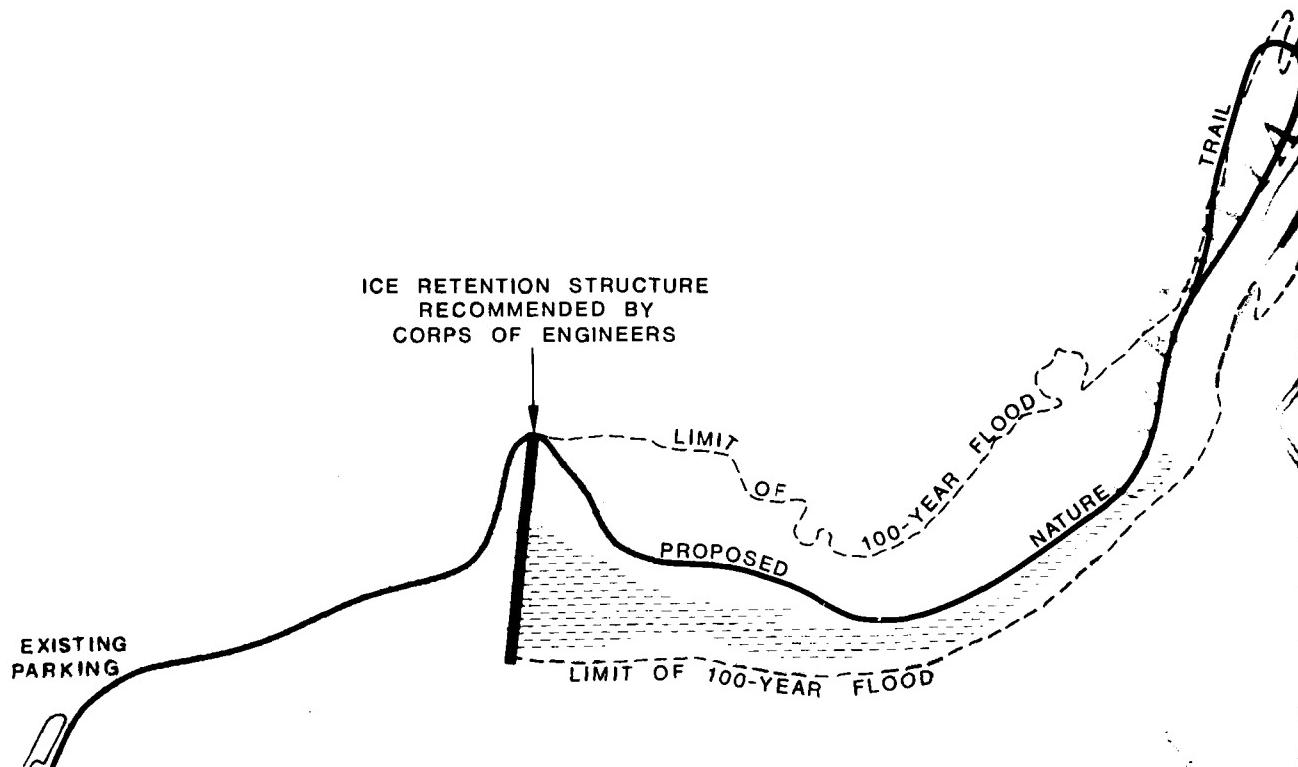
Engineering Company

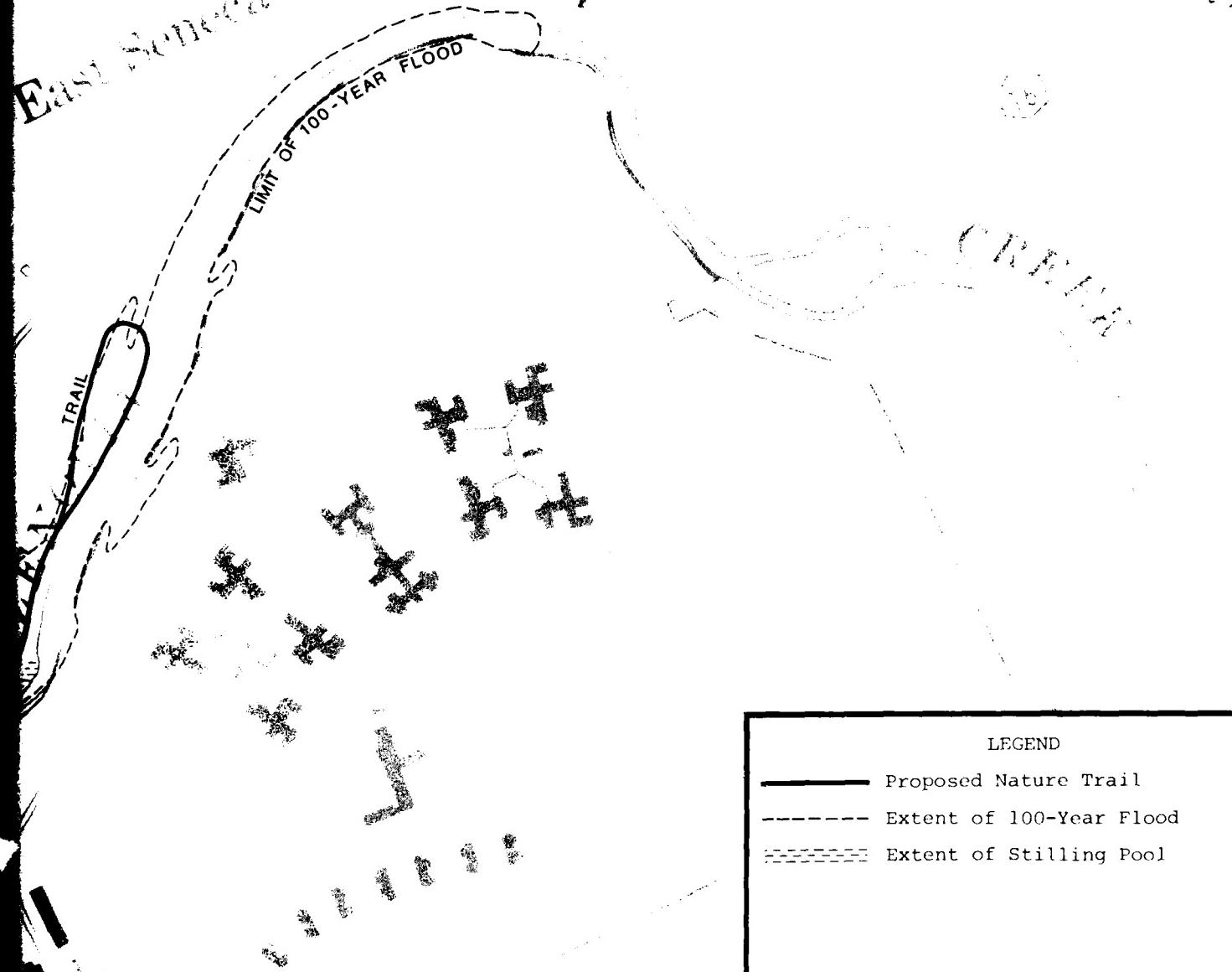
PRELIMINARY FEASIBILITY REPORT

107







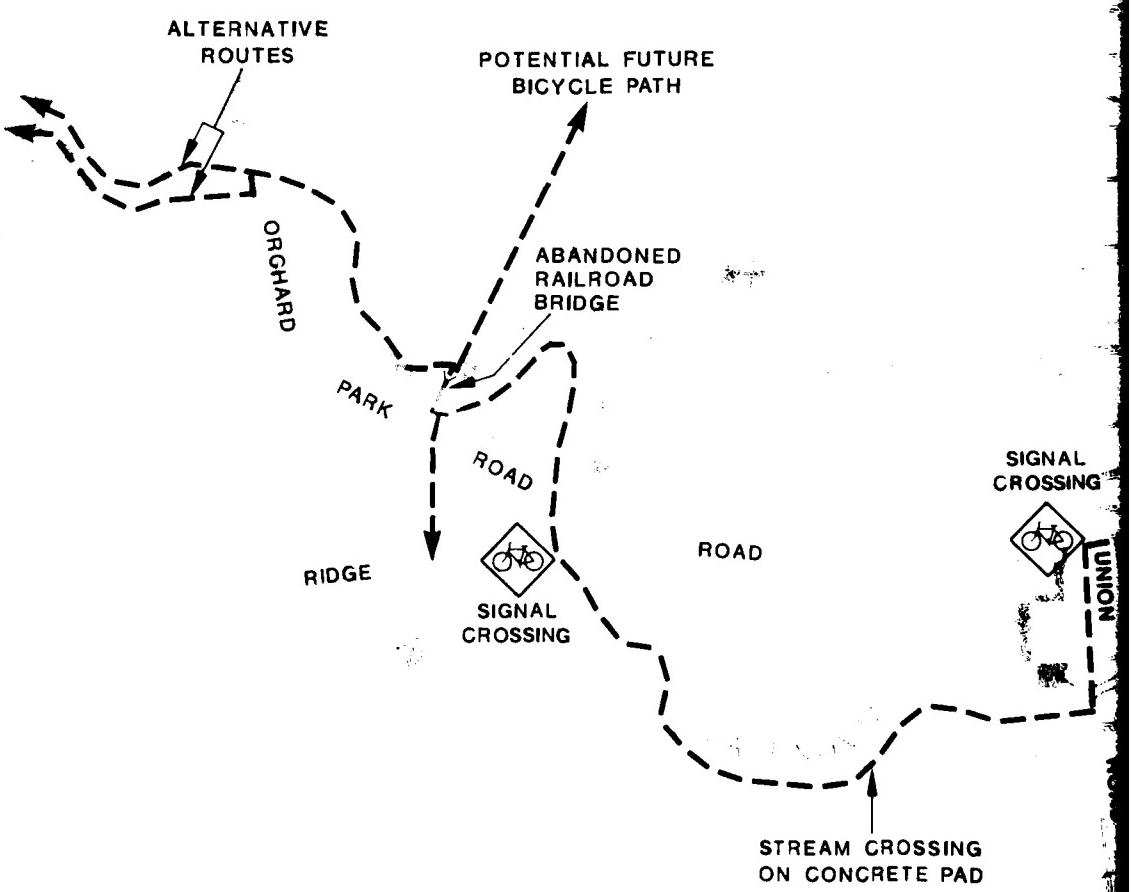


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## CAZENOVIA CREEK IMPROVEMENTS

US Army • Corps of Engineers • Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975





ATTACHMENT 1

LEGEND

- Proposed Surfaced Bicycle Path
- Proposed Nature Trail



NORTH

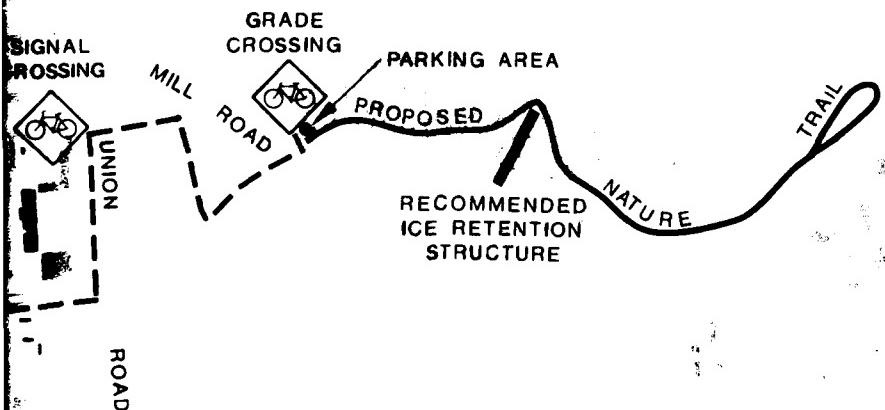
2000 2000

Scale in Feet

Buffalo Metropolitan Area New York

## CAZENOVIA CREEK BICYCLE PATH

US Army Corps of Engineers Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975



FERRY ACCESS TO  
BEAVER ISLAND  
STATE PARK  
FROM SEVERAL  
POINTS ON  
BUFFALO WATER  
FRONT

- NEW PARK LAND
- IMPROVED ACCESS TO RIVER
- BIKE PATHS EXTENDING TO ISLE VIEW PARK

BICYCLE PATHS  
ADDITIONAL PARKING  
ON SQUAW ISLAND

REHABILITATION OF  
BIRD ISLAND PIER  
FOR SAFE FISHING

REHABILITATION  
OF DAY'S POINT  
AND LASALLE PARK

IMPROVED ACCESS TO ERIE BASIN  
BICYCLE PATHS CONNECTING AREAS

REHABILITATION AND  
EXPANSION OF NFTA  
SMALL BOAT HARBOR

ICE RETENTION ST  
& FLOOD CONTROL  
RECOMM  
CORPS OF

FLOOD CONTROL PROJECT  
PROPOSED BY  
CORPS OF ENGINEERS

E VIEW PARK

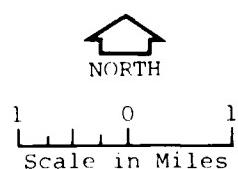
FLOOD CONTROL PROJECT  
PROPOSED BY  
CORPS OF ENGINEERS

FLOOD CONTROL PROJECT  
CONSIDERED BY  
CORPS OF ENGINEERS

WA

PROPOSED BIKE PATH  
PROPOSED NATURE TRAILS  
IN PROJECT AREA

ENTION STRUCTURE  
CONTROL PROJECT  
RECOMMENDED BY  
CORPS OF ENGINEERS



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### REGIONAL IMPROVEMENTS LOCATION MAP

US Army • Corps of Engineers • Buffalo District  
to accompany  
PRELIMINARY FEASIBILITY REPORT  
1975

## BUFFALO METROPOLITAN AREA STUDY • SUMMARY

LOCATION	MEASURE	TOTAL DEVELOPMENT COSTS <sup>1/</sup>	ANNUAL OPERATION & MAINTENANCE COSTS
RIVERSIDE PARK, BUFFALO to ISLEVIEW PARK, TONAWANDA	A Improvements to Existing Shoreline, Bicycle Path, and Pedestrian Overpass  B Park Construction, Bicycle Path, Walkway, Overpass, Parking  C Park Construction, Bicycle Path, Walkway Overpass, Parking, and Picnic Area	\$ 313,000  790,000  1,293,000	\$ 71,000  183,000  232,000
SQUAW ISLAND and BIRD ISLAND PIER	A Pier Rehabilitation Recreation Access Improvements, Squaw Island Parking  B Pier Rehabilitation Recreation Access Improvements, Squaw Island Parking, Park Development	202,000  325,000  202,000	19,000  78,000
ERIE BASIN MARINA to LaSALLE PARK and DAY'S POINT	A Day's Point Parking, Bicycle Path  B Shore Protection in LaSalle Park Bicycle Path, Day's Point Parking	49,000  292,000	25,000  29,000
NFTA SMALL BOAT HARBOR	A Dike Rehabilitation, Bicycle Path, Parking, Picnic Area  B Park development, Boat Slips, Bicycle Path, Parking, Picnic Area, Dike Rehabilitation  C Boat Slips, Bicycle Path, Parking, Park Development, Picnic Area	172,000  745,600  1,978,500	63,000  95,000  136,600
WATERFRONT FERRY SERVICE	Two 25-Passenger Boats Nine Landing Docks	165,000	42,000
DELAWARE PARK LAKE	Two extensions of existing Bicycle Path System  Increased Cost to C of E for Maintenance of Black Rock Lock and Channel if Delaware Park Lake is Bypassed.	37,000  12,000	31,000  12,000
CONTROL of FLOATING DRIFT and STREAMBANK DEBRIS	Enforce existing laws & Improve if necessary Periodic streambank maintenance Niagara Riverfront maintenance Niagara Riverfront surveillance	40,000  35,000  30,000  1,500	40,000  35,000  30,000  1,500
CAZENOVIA CREEK	Hiking and Nature Trail Recreation Access Improvements, Bicycle Path to Cazenovia Park	9,600  50,000	41,100

## SUMMARY OF ALTERNATIVE IMPROVEMENT MEASURES

ALTERNATIVE & ENHANCEMENTS	ANNUAL REPLACEMENT COSTS	AVERAGE ANNUAL COSTS <sup>2/</sup>	TOTAL DAILY CAPACITY (USER-DAYS)	ESTIMATED ANNUAL VISITATION (USER-DAYS)	BENEFIT PER USER-DAY	ANNUAL BENEFITS <sup>3/</sup>	BENEFIT-COST RATIO
71,000	\$ 5,800	\$ 114,000	8,125	707,000	\$ 1.50	\$ 887,000	7.8
33,000	2,300	234,000	10,525	915,800	1.50	1,148,000	4.9
32,000	3,300	316,000	13,325	1,160,000	1.50	1,454,000	4.6
19,000	5,600	61,000	2,200	191,400	1.50	240,000	3.9
78,000	6,000	163,000	4,500	391,500	1.50	491,000	3.0
25,000	250	28,000	2,900	252,300	1.50	316,000	11.3
29,000	250	47,000	3,350	291,500	1.50	365,000	7.8
63,000	1,000	75,000	1,815	158,000	1.50	198,000	2.6
95,000	4,400	145,000	2,830	238,000	1.50	298,000	2.1
36,600	4,840	264,800	5,027	429,319	1.50	539,000	2.0
42,000	2,500	55,000	400	26,400	3.00	66,000	1.2
31,000	200	34,000	3,500	304,500	1.50	382,000	11.2
12,000							
40,000							
35,000							
30,000							
1,500							
41,100	340	45,200	4,555	400,900	1.50	406,100	9.0

NOTES:

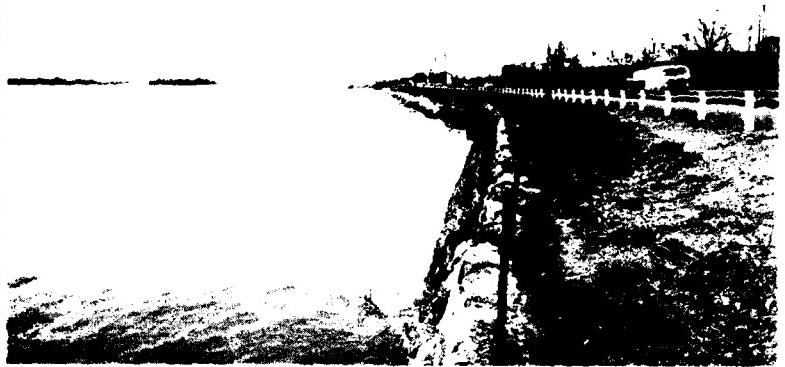
- 1/ Includes approximately 35% for Engineering, Supervision, Administration and Contingency. Does not include interest during construction.
- 2/ Assumes interest rate of 5 7/8% and 50 Year Amortization Period.
- 3/ Assumes full benefits achieved in 5 years, increasing by 20% per year.



Bird Island Pier near  
the Peace Bridge



Recreational use of  
Bird Island Pier poses  
safety hazards



Niagara River shoreline  
in the vicinity of  
Riverside Park



Pedestrian access to the  
shoreline near Riverside  
Park is difficult and  
hazardous

77-0-18



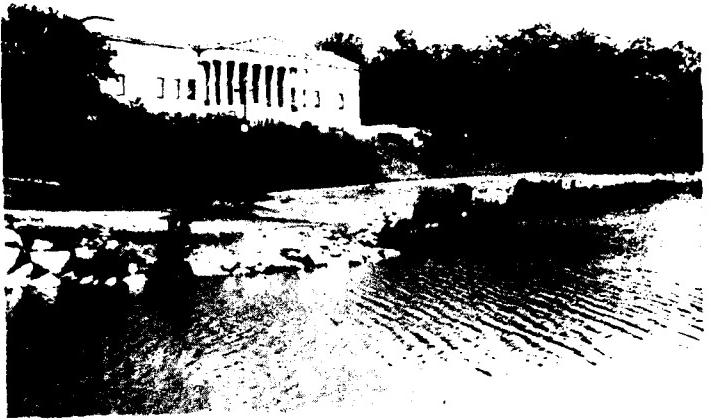
Frontal view of the  
bank. Note the talus  
material at top forming  
soft talus wall.

Worth noting that this  
was a talus wall on the  
order of 10 feet high.

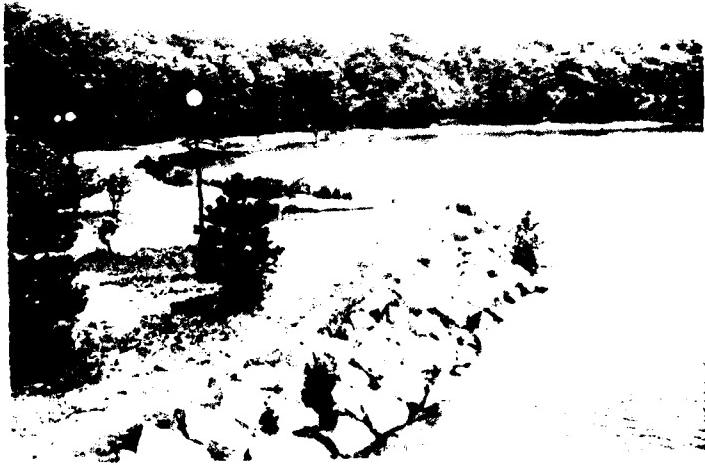


Frontal view, like at  
MIA Small Port Harbor.  
Note talus of concrete  
fragments.





Proposed extension  
of the Delaware Park  
recycling plant system  
would include areas of  
historic and cultural  
interest in Buffalo.  
Proposed





The proposed Canevia Creek bicycle path would pass through several heavily wooded areas, providing the opportunity for quiet rest.



Canevia Park would be connected to Mill Park (4 miles upstream) by the proposed bicycle path.

